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967 VOL. 21 No. 11  
2C78

March 12, 1971



*Cooperative*  
**ECONOMIC INSECT  
REPORT**

*Issued by*

**PLANT PROTECTION DIVISION**

**AGRICULTURAL RESEARCH SERVICE**

**UNITED STATES DEPARTMENT OF AGRICULTURE**

# AGRICULTURAL RESEARCH SERVICE

## PLANT PROTECTION DIVISION

### ECONOMIC INSECT SURVEY AND DETECTION

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**Current Conditions

ALFALFA WEEVIL larvae heavy on alfalfa in Oklahoma. (p. 125).

A TREE CRICKET damaged red raspberries in Oregon. TWOSPOTTED SPIDER MITE severe and increasing on strawberries in Florida. (p. 126).

BALSAM WOOLLY APHID damaging spruce and fir in western North Carolina. (p. 126).  
COMMON CATTLE GRUB heavy in cattle in Nebraska, moderate in Arkansas and Kentucky. (p. 127).

Predictions

Egg hatch of EASTERN TENT CATERPILLAR expected last 15 days of March in Virginia. SOUTHERN PINE BEETLE potential high for timber loss during summer and fall in North Carolina. (p. 126). BLACK CUTWORM poses potential threat to corn in Illinois. (p. 147). CORN ROOTWORMS expected to cause some problems in South Dakota, Minnesota, Illinois, and Maryland. (pp. 148, 149, 151). EUROPEAN CORN BORER first generation damage could be excessive in South Dakota (p. 142); heavy populations expected in Nebraska (p. 142); increased problems probable in southwest, south-central, southeast, and west-central Minnesota (p. 143). PALE WESTERN CUTWORM expected to be troublesome in southwestern South Dakota (p. 153).

Detection

AN ITCH MITE and LARGE TURKEY LOUSE reported for first time in Oregon. (p. 127).

For new county records see page 128.

Special Reports

Summary of Insect Conditions in the United States - 1970.

Special Insects of Regional Significance (pp. 130-142).

Corn, Sorghum, Sugarcane (pp. 142-153).

Small Grains (pp. 153-155).

Turf, Pastures, Rangeland (pp. 156-158).

Distribution of Northern Corn Rootworm. Map. (p. 150).

Some First Occurrences of Season

ALFALFA WEEVIL adults in Nevada and larvae in Missouri. ALFALFA CATERPILLAR moths in Alabama. PEAR PSYLLA eggs in Washington. APPLE APHID nymphs in Washington. GREEN PEACH APHID nymphs in Washington. A TREE CRICKET in Oregon. POPLAR-AND-WILLOW BORER adults in Washington. BOXELDER BUG adults in Delaware and Tennessee.

Reports in this issue are for week ending March 5 unless otherwise indicated.



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WEATHER OF THE WEEK ENDING MARCH 8

HIGHLIGHTS: Winter temperatures prevailed over most of the Nation. Heavy snow fell in the central Great Plains and the Northeast. Severe thunderstorms and a few tornadoes occurred in the Deep South.

PRECIPITATION: A generous variety of stormy weather occurred in the first week of March. Early in the week, cold gusty winds filled the air with dust and sand in the deserts of California and Arizona and by Tuesday, blowing sand and dust had spread to southern New Mexico and western Texas. Snowy, windy weather spread from the Rocky Mountains and the southwestern Great Plains to the middle Mississippi River Valley. Rain and showers occurred southeast of the snow belt. Violent thunderstorms and a few tornadoes struck the Deep South. A broad band of rain fell Tuesday in connection with a stationary front that stretched from southern Texas to southern California. Some spots in central Mississippi and central Alabama received 24-hour totals exceeding 4 inches. A tornado leveled trees in southern Alabama. Snow fell from New Mexico to Arkansas, showers were common from northeastern Texas to the Ohio River Valley and onward to the central Appalachians. Early Wednesday, a storm in the Southeast deepened and spread disagreeable weather over the eastern half of the Nation. Tornadoes occurred in South Carolina and the Tampa, Florida, area. Showers fell along the Atlantic coast. A wide band of snow or snow mixed with sleet or freezing rain fell from the Ohio River Valley to Maine and southward to northern Alabama and the Carolinas. The storm center deepened. Pressure at Portland, Maine, dropped to 28.44 inches, the lowest pressure in their century of records. Winds Thursday afternoon gusted to 75 m.p.h., hurricane force. A foot or two of snow fell in parts of New York and New England. Portland, Maine, received 11 inches of new snow in 6 hours early Friday morning, bringing their seasonal total to 116.5 inches. This is more snow than has fallen in any season in the 20th century. Light rain and snow flurries fell in the Pacific Northwest mostly late in the week. As the deep storm in the Northeast moved out over the Atlantic Ocean over the weekend, another storm moved from the southern Great Plains to the Northeast. It produced inclement weather over the eastern half of the country, heavy snow, sleet, and freezing rain in the Northeast, severe thunderstorms and a few tornadoes in the Deep South. As the week ended, a weak storm brought snow flurries to the intermountain region and northern Rocky Mountains.

Weather of the week continued on page 129.

## SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

ARMY CUTWORM (Euxoa auxiliaris) - COLORADO - Surveys negative in wheatfields checked in Larimer County. (Johnson). OKLAHOMA - Larvae averaged 10 per linear foot of wheat in Washita County. (Okla. Coop. Sur.).

BEEF LEAFHOPPER (Circulifer tenellus) - CALIFORNIA - Winter control in breeding grounds complete, total of 27,376 acres treated. Populations in San Joaquin Valley foothill areas about same as those of 1966 and 1969. Counts averaged 3 per 10 sweeps with some of 7-8 in Antelope Valley, Los Angeles County. Beets in area harvested and new plantings will start soon. Summer-like weather in this area caused some germination of Russian thistle. This may prevent female leafhoppers from migrating to foothills. (Cal. Coop. Rpt.).

GREENBUG (Schizaphis graminum) - WASHINGTON - Heavy infestations on wheat reported in late fall 1970 in Franklin and Benton Counties; additional infestations noted in Grant, Adams, Yakima, Klickitat, and Walla Walla Counties. Following high winds, blowing dust, and some rain, population apparently decreased. Current reports indicate slight increase. (Klostermeyer et al.). COLORADO - Surveys negative in wheat checked in Larimer County. (Johnson). OKLAHOMA - Ranged 100-1,000 per linear foot of wheat; snow and cold weather caused no noticeable decrease. Averaged 50 per linear foot in triticales (new crop, combination of wheat and rye) in Washita County. Ranged 150-175 per linear foot in 3 wheatfields in Tillman County; heavy in Cotton County. Averaged 32 per linear foot in small wheatfield in Stillwater area, Payne County. (Okla. Coop. Sur.).

## CORN, SORGHUM, SUGARCANE

EUROPEAN CORN BORER (Ostrinia nubilalis) - IOWA - Third-generation larvae successfully entered hibernation in Boone County in fall 1970. This is first record of this occurrence in State. (Iowa Ins. Sur.).

## SMALL GRAINS

GREAT BASIN WIREWORM (Ctenicera pruinina) - WASHINGTON - Larvae in top layer of soil moderately damaged 10 acres of wheat near Wiley City, Yakima County. (Foiles, Feb. 9).

BROWN WHEAT MITE (Petrobia latens) - OKLAHOMA - Moderate to heavy (500-1,000 per linear foot) in wheat in Washita County. (Okla. Coop. Sur.).

## FORAGE LEGUMES

ALFALFA WEEVIL (Hypera postica) - FLORIDA - Collected 12 larvae in 100 sweeps of 10-inch alfalfa at Gainesville, Alachua County. Determined by D.H. Habeck. (Mead). KENTUCKY - Egg averages per square foot in 3 fields by county: Fayette 218, Warren 130. (Barnett). ARKANSAS - Continues active in southwest area; counts not economic. (Barnes). Surveys in northwest area negative, probably due to snow and cold temperatures earlier. (Jones). MISSOURI - Eggs ranged 60-226 per square foot during January surveys in southeast and south-central areas. First larvae of season collected at Cook Station, Crawford County, February 26. (Munson). OKLAHOMA - Larvae heavy on alfalfa in Bryan and Choctaw Counties. Damage heavy to early growth and controls underway. (Okla. Coop. Sur.). NEVADA - Adults observed in flight in southern Washoe County during warm period February 8-12. Activity decreased later due to cooler weather. (Nev. Coop. Rpt.).

ALFALFA CATERPILLAR (Colias eurytheme) - ALABAMA - Moths noted in flight over crimson clover and burclover fields and roadside plantings in south and central areas. Egg laying light. (McQueen).

GREEN CLOVERWORM (Plathypena scabra) - FLORIDA - Larvae 5 in 100 sweeps of 10-inch alfalfa at Gainesville, Alachua County. Determined by D.H. Habeck. (Mead).

## DECIDUOUS FRUITS AND NUTS

PEAR PSYLLA (Psylla pyricola) - WASHINGTON - Early warm temperatures resulted in few eggs from overwintered females on fruit spurs February 1 at Sawyer and Donald; earliest record in 6 years. First eggs in Yakima on February 10, eleven days earlier than 1970. First eggs in upper Yakima Valley, Yakima County, February 15-18. Controls delayed due to cool temperatures. First eggs noted February 26 at Rock Island, Douglas County. (Johnson, Rushmore).

APPLE APHID (Aphis pomi) - WASHINGTON - Egg hatch noted February 10 at Yakima and Naches, and February 18 at Tieton, Yakima County. (Johnson).

GREEN PEACH APHID (Myzus persicae) - WASHINGTON - Eggs hatched February 1 at Sawyer and Donald, Yakima County. Peach buds swelled due to early warm temperatures. Subsequent low temperatures caused aphid mortality. First hatch in upper Yakima Valley February 10. (Johnson).

WOOLLY APPLE APHID (Eriosoma lanigerum) - ALABAMA - Heavy on roots of 5 apple trees in Lee County; these trees maintained heavy infestation for several years. (McQueen).

## SMALL FRUITS

MULBERRY WHITEFLY (Tetraleurodes mori) - CALIFORNIA - All instars 300 per leaf on Mexican guava and citrus locally at San Diego, San Diego County. Heaviest on guava. (Cal. Coop. Rpt.).

A TREE CRICKET (Oecanthus rileyi) - OREGON - Severely damaged 5-acre planting of red raspberries in Marion County. Egg punctures on estimated 80 percent of canes. (Wernz). These punctures also provide points of entrance for caneberry diseases. (Penrose).

TWOSPOTTED SPIDER MITE (Tetranychus urticae) - FLORIDA - Severe and increasing on 180 acres of strawberries at Bradenton, Manatee County, and on 40 acres at Plant City, Hillsborough County. (Poe).

## FOREST AND SHADE TREES

SOUTHERN PINE BEETLE (Dendroctonus frontalis) - NORTH CAROLINA - Surveys during December 1970 indicated about 937 shortleaf pine, Virginia pine, and pitch pine with brood density of 333 larvae per square foot in the Cheoah district, and 820 pines with brood density of 227 larvae per square foot on Great Smoky Mountain National Park in western portion of State. Potential high for increased loss of timber in summer and fall of 1971. (USFS).

BALSAM WOOLLY APHID (Adelges piceae) - NORTH CAROLINA - Aerial survey indicates fir mortality continuing at estimated steady rate in remote infested areas. Mortality now occurring on every major spruce and fir area in western mountains. (USFS).

EASTERN TENT CATERPILLAR (Malacosoma americanum) - VIRGINIA - Egg hatch in southern Tidewater areas expected last 2 weeks in March. Hatch in Piedmont and mountain areas normally delayed until first of April. However, recent warm weather may hasten hatch. (Allen).

POPLAR-AND-WILLOW BORER (Cryptorhynchus lapathi) - WASHINGTON - Live adults found February 2 in galleries tunneled in willow at Mount Vernon, Skagit County. (Pennell et al.).



## MAN AND ANIMALS

SCREWORM (Cochliomyia hominivorax) - No cases reported in U.S. February 28 to March 6. Total of 95 laboratory-confirmed cases reported in portion of Barrier Zone in Republic of Mexico as follows: Sonora 50, Chihuahua 8, Nuevo Leon 4, Tamaulipas 33. Total of 25 cases reported in Mexico south of Barrier Zone. Barrier Zone is area where eradication operation underway to prevent establishment of self-sustaining population in U.S. Sterile screwworm flies released: Texas 15,618,000; Mexico 131,988,000. (Anim. Health Div.).

COMMON CATTLE GRUB (Hypoderma lineatum) - NEBRASKA - Grub cysts ranged 0-45 (averaged 8-9) per head on about 90 percent of yearlings examined in Cherry, Banner, Morrill, Scotts Bluff, Dawson, Custer, McPherson, Logan, Lincoln, and Brown Counties. Heavy on animals not treated with systemic insecticides. (Keith). ARKANSAS - Ranged 0-28 (averaged 9.27) per head of 33 beef cattle in Benton County. (Lancaster, Simco). KENTUCKY - Averaged 5.2 (ranged 0-35) per animal on backs of Holstein cattle of various ages in central area. Specimen also taken from horse in Fayette County. (Barnett).

HORN FLY (Haematobia irritans) - FLORIDA - Adults averaged 22 per head of dairy cattle near Gainesville, Alachua County. (Mead).

CATTLE LICE - NEBRASKA - Linognathus vituli (longnosed cattle louse) and Haematopinus eurysternus (shortnosed cattle louse) generally light; most yearling animals infested in Cherry, Banner, Morrill, Scotts Bluff, Dawson, Custer, McPherson, Logan, Lincoln, and Brown Counties. (Keith). OKLAHOMA - Mainly H. eurysternus heavy on cattle in Cotton County; first heavy infestation reported this winter. Continues moderate on cattle in Mayes and Choctaw Counties. (Okla. Coop. Sur.).

LARGE TURKEY LOUSE (Chelopistes meleagridis) - OREGON - All stages moderately heavy on turkeys at Oregon City, Clackamas County, in early January 1971. Collected and determined by R.L. Westcott. This is a new State record. (Westcott, Gray).

AN ITCH MITE (Notoedres douglasi) - OREGON - Found in skin lesions of silvery gray squirrel February 27, 1971, at Hood River, Hood River County. Collected by H.C. Morse. Determined by G.W. Krantz. This is a new State record. This mite now considered responsible for declining host populations. Infestation by this mite produces mangy condition which reduces squirrels ability to survive winter months. (Krantz).

NORTHERN FOWL MITE (Ornithonyssus sylviarum) - ARKANSAS - Heavy on caged layers in Washington County. (Simco).

## HOUSEHOLDS AND STRUCTURES

BOXELDER BUG (Leptocoris trivittatus) - DELAWARE - Annoying in homes in New Castle County. (Burbutis). TENNESSEE - Annoying in and around homes in Loudon County. Controls underway. (McCall).

BROWN SPIDER BEETLE (Ptinus clavipes) - IOWA - Collected from home at Mt. Union, Henry County, February 26, 1971. This is a new county record. Has now been recorded in 29 counties. (Iowa Ins. Sur.).

PAVEMENT ANT (Tetramorium caespitum) - NEVADA - Light to heavy in homes and other buildings at Reno, Washoe County. (Nev. Coop. Rpt.).

SOUTHERN LYCTUS BEETLE (Lyctus planicollis) - OREGON - General infestation of ash kitchen cabinets in Grants Pass area residence, Josephine County, reported February 26. Currently, 3-4 adults emerging per day. (McLoughlin).

## BENEFICIAL INSECTS

A BRACONID (Microctonus aethiops) - MARYLAND - Collected June 24, 1970, at Germantown, Montgomery County, by W. Hollaway. Determined by P. Marsh. Parasitizes Hypera postica (alfalfa weevil). This is a new county record. (U. Md., Ent. Dept.).

AN ICHNEUMON WASP (Eriborus terebrans) - INDIANA - Pupa collected July 23, 1969, from tunnel of first-generation Ostrinia nubilalis (European corn borer) in Wells County. Previous releases as follows: Marshall and Jasper Counties 1947, no recoveries; Steuben County 1930, 1931, and 1932, no recoveries in 1933, 1935, 1939, and 1944. First recovered in Steuben County in 1948; parasitized 20 of 92 borers collected. Collected in same area in 1949 when 27.3 percent of borers were parasitized. (Meyer).

## FEDERAL AND STATE PLANT PROTECTION PROGRAMS

IMPORTED FIRE ANT (Solenopsis saevissima richteri) - SOUTH CAROLINA - Specimens collected at Blenheim, Marlboro County, by G.H. Smith on February 22, 1971. Determined by V.H. Owens, confirmed by D.R. Smith. This is a new county record. (PPD).

OBSCURE SCALE (Melanaspis obscura) - CALIFORNIA - Counts of 4 per 10 feet of bark of Quercus cerris (turkey oak) and Q. phellos (willow oak) trees in same park where original 4 infested trees planted. About 38 oak trees will receive systemic treatment. Dormant oil applied to 4 original trees. This scale very difficult to eradicate. (Cal. Coop. Rpt., Feb. 26).

WOOLLY WHITEFLY (Aleurothrixus floccosus) - CALIFORNIA - Surveys indicate additional infested orange, lemon, and tangerine trees at San Diego, San Diego County. Eggs and nymphs light to medium. Infestations local and widely separated, and outside treatment areas. (Cal. Coop. Rpt., Feb. 26).

## DETECTION

New State Records - AN ITCH MITE (Notoedres douglasi) OREGON - Hood River County (p. 127). LARGE TURKEY LOUSE (Chelopistes meleagridis) OREGON - Clackamas County (p. 127).

New County Records - A BRACONID (Microctonus aethiops) MARYLAND - Montgomery (p. 128). BROWN SPIDER BEETLE (Ptinus clavipes) IOWA - Henry (p. 127). IMPORTED FIRE ANT (Solenopsis saevissima richteri) SOUTH CAROLINA - Marlboro (p. 128). WESTERN BEAN CUTWORM (Loxagrotis albicosta) KANSAS - Logan and Barton (p. 147).

## LIGHT TRAP COLLECTIONS

FLORIDA - Gainesville, 2/26-3/4, BL - Black cutworm (Agrotis ipsilon) 4, granulate cutworm (Feltia subterranea) 46, saltmarsh caterpillar (Estigmene acrea) 1. MISSISSIPPI - Stoneville, 2/23-3/4, 2BL, Temp. 27-74° F., precip. 1.62 - Armyworm (Pseudaletia unipuncta) 53, black cutworm 26, saltmarsh caterpillar 1, variegated cutworm (Peridroma saucia) 41, yellowstriped armyworm (Spodoptera ornithogalli) 3. TEXAS - Waco, 2/25-3/4, BL - Armyworm 23, beet armyworm (Spodoptera exigua) 3, black cutworm 3, granulate cutworm 7, saltmarsh caterpillar 1, variegated cutworm 18, yellowstriped armyworm 6.

HAWAII INSECT REPORT

General Vegetables - LEAFMINER FLIES (Liriomyza spp.) generally light in most tomato and cucumber fields at Hilo, Honokaa, and Kona, Hawaii; moderate in old 0.25-acre planting of tomato at Honokaa. (Kobayashi, Matayoshi). Larvae of BEAN FLY (Melanagromyza phaseoli) light to moderate in 0.25 acre of snap beans at Hilo; about 25 percent of seedlings affected. Adults light; parasites nil. (Yoshioka). SWEETPOTATO VINE BORER (Omphisa anastomosalis) heavy in small backyard planting of sweetpotato at Ewa, Oahu. Infested material examined showed average of 5 larvae and 6 pupae per 2 feet of stem. Heavy in small backyard planting of same crop at Wailuku, Maui. (Au, Miyahira). Adults of CARMINE SPIDER MITE (Tetranychus cinnabarinus) trace (averaged less than 1 per leaf) in small planting of eggplant at Waikapu, Maui. All stages trace in most cucumber and tomato plantings at Hilo, Honokaa, and Kona, Hawaii. (Miyahira et al.).

Fruits and Nuts - COCONUT LEAFROLLER (Hedylepta blackburni) damage heavy (about 90 percent defoliation) to 100+ coconut trees at Waiehu, Maui. Late instars light; empty pupal cases of dipterous and hymenopterous parasites noted. (Miyahira). A FLATID BUG (Melormenis antillarum) light (ranged 3-5 nymphs and/or adults per 5 foot of terminal branch) on roadside guava trees at Hilo, Hawaii. Counts of 25 nymphs and/or adults on same host in mid-December 1970. (Yoshioka).

Beneficial Insects - Larvae of LANTANA DEFOLIATOR CATERPILLAR (Hypena strigata) moderate on roadside lantana plants between Waimea and Kona, Hawaii; defoliation 70 percent. Larvae heavy on same host at Keokea and Waiakoa, Maui; defoliation 70-90 percent. Moderate in lowland areas of Waihee; about 50 percent defoliation. (Miyahira et al.).

Miscellaneous Pests - Adult collections of a SCIARID FLY (Sciara garretti) ranged 800-1,000 in light traps weekly throughout February on Oahu. During same period heavy swarms occurred at Puaho, Hawaii; "thousands" entered homes at night. (Au, Yoshioka). Destroyed 321 specimens of GIANT AFRICAN SNAIL (Achatina fulica) at Poipu and 2 at Wahiawa on Kauai during February. No live snails detected at Kona, Hawaii, where 12 snails noted during April 1970. (Sugawa et al.).

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Weather of the week continued from page 123.

TEMPERATURE: Cold windy weather prevailed in the Far West early in the week. Temperatures dropped to 32° or lower along the coast of Washington and Oregon and at spots along the California coast. Sandberg, California, registered 16° Tuesday morning. Subfreezing weather occurred on Tuesday over the Trans-Pecos area and the Texas Panhandle, western Oklahoma, the central Great Plains, and most of the area north of the Ohio River and Mason Dixon Line. Cold, blustery winds held midday temperatures below freezing as far south as Lubbock, Texas, and the Great Lakes on Tuesday, and on Wednesday most of Kentucky remained below freezing throughout the day. By Friday morning, subfreezing temperatures were common in northern Florida with Tallahassee setting a new March record with a reading of 23°. Temperatures at spots in the southern Rocky Mountains dropped to below zero Wednesday morning, but warming occurred in the West as the weekend approached and afternoon temperatures in the 40's and 50's were common in the mountains in Colorado and New Mexico. The weekend storm moved from the southern Great Plains to the Northeast. Cold winds on the back side of the storm dropped temperatures to the low 30's as far south as the Gulf States. Birmingham, Alabama, registered 32° Sunday morning. Temperatures averaged below normal over most of the Nation. The central and southern Rocky Mountains and southern Great Plains averaged 5° to 12° colder than normal. (Summary supplied by Environmental Data Service, ESSA.)



SUMMARY OF INSECT CONDITIONS IN THE UNITED STATES - 1970  
(Continued from page 122)

SPECIAL INSECTS OF REGIONAL SIGNIFICANCE

Highlights:

ARMY CUTWORM was generally light and no problems developed as in 1969. ARMYWORM moth flights were heavy in some sections early in the season, but larval damage did not approach the levels reported in 1969. Some damage to no-till corn was reported in Virginia and West Virginia. CORN EARWORM larvae damaged soybeans in several Southern States, but was not serious on crops in the Northeast. Populations increased in several Midwest States. GREENBUG reduced sorghum yields in South Dakota, caused some scattered damage to sorghum in Nebraska, and necessitated controls on 400,000 acres of this crop in Kansas, mostly in the western districts. Some damage was reported in Texas. SPOTTED ALFALFA APHID was heavy on alfalfa in Arizona and required some controls in New Mexico. TOBACCO BUDWORM damaged tobacco in North Carolina, and was the most serious pest of this crop in South Carolina and the primary pest of shade-grown tobacco in Florida. TOBACCO HORNWORM was a special problem on flue-cured tobacco in Suwannee County, Florida.

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ARMY CUTWORM (Euxoa auxiliaris) was generally light and scattered on seed alfalfa in Humboldt County, NEVADA, when compared with recent years. There were about 200 acres that required controls. Injury to small grains in UTAH was light. However, there was locally moderate damage in some counties. Damage was light to moderate on range plants, but populations were below the normal counts. Larval damage to forage legumes was spotty during the spring and early growth was retarded. Army cutworm and Agrotis orthogonia (pale western cutworm) populations in northeastern COLORADO wheat were light. Loss in some fields was due to a combination of drought and cutworms. Army cutworm was light in all areas of WYOMING. Moths were first observed May 20 in Goshen County. An isolated larval infestation in NORTH DAKOTA damaged sugar beets in Richland County. Controls were applied to 75 acres of sugar beets in Walsh County. Larval counts of 1-2 per plant destroyed one-third of a field near Mitchell in Davison County, SOUTH DAKOTA, during late May. This field required replanting. Army cutworm larvae were light on wheat in the southwest and panhandle districts of NEBRASKA. Fifth to seventh instars averaged less than one per row foot in 53 fields of wheat in Keith, Perkins, Chase, Dundy, and Hitchcock Counties April 7-9. Counts averaged about one per linear yard in Deuel County April 16 and less than one per row foot in several Hitchcock County fields May 1. There were very few economic infestations in Nebraska. Larvae averaged 6 per 10 square feet in one Frontier County seedling alfalfa field May 8 and about 75 percent of the stand was lost. Most alfalfa damage was over by May 8. There were no reports of damage to wheat by army cutworm in KANSAS. Very few moths were caught in blacklight traps in Barton, Finney, Greeley, and Thomas Counties, compared to 1968 and 1969.

ARMYWORM (Pseudaletia unipuncta) was unusually heavy on corn and sorghum in CALIFORNIA, and continued until late in the season. Larvae were unusually prevalent on seedling beans due to late rains. In OKLAHOMA, larvae damaged small grains from late May to mid-June. Counts were heavy in Caddo, Major, Canadian, and Kingfisher Counties. Light to moderate counts were widespread in the northwestern, north-central, west-central, central, and south-central areas. Damage was not significant in KANSAS. Larvae were reported abundant in lawns and grassy areas at Manhattan, Riley County, in May, and were light in grassy alfalfa in Bourbon County. Large flight peaks of armyworm moths were recorded May 15 and July 10 in NEBRASKA at Lincoln, Lancaster County, and at Concord, Dixon County. There was a very small third peak at Lincoln August 14. Larval damage was light and scattered in the eastern and southeastern areas in early June. First to third instars ranged 50-75 per 100 sweeps in bromegrass pastures in Lancaster County May 16. Larvae were generally light on wheat in the central, southeastern,



southwestern, and panhandle counties. Populations were economic in Lancaster, Otoe, and Nemaha Counties by June 5. Larvae ranged 4-20 per square foot on some wheat and rye in Lancaster County, but the infestation was not generally extensive. Damage had subsided by June 15 at most Nebraska locations. There were some small armyworm outbreaks in WYOMING on oats, barley, and corn in Goshen, Converse, and Crook Counties in late July and early August. Excellent results were noted on oats treated in Goshen County. Armyworm also caused minor damage to lawns and gardens at Torrington, Goshen County, and at Worland, Washakie County.

Armyworm larvae were heavy in 12 eastern counties of SOUTH DAKOTA during a cool June. Damaging infestations were reported initially on rye and winter wheat in Beadle, Davison, Aurora, Turner, Spink, and Brookings Counties. Larvae per square foot of rye ranged 4-8 in Davison and Brookings Counties, 8-14 in Beadle County, and 15-20 in Spink County. Larvae were usually somewhat heavier in lodged areas. Moth flights at Brookings, Brookings County, were heavy in late May through the first half of June, and again in early July. Warm weather in early July increased parasitism significantly. Parasites were partly responsible for the decline of armyworm in July. About 10,000 acres of rye and winter wheat were successfully treated. Armyworm moths were active in NORTH DAKOTA the first week in April, and counts peaked in mid-June. There were only a few isolated larval infestations and damage. In MINNESOTA, moths were relatively heavy in blacklight traps at Rochester, Olmsted County, and at Worthington, Nobles County, in mid-May and at Fergus Falls, Otter Tail County, and at Crookston, Polk County, in early June. There were some widely scattered economic infestations of 6 or more larvae per square foot in early July in Sibley, Brown, and Steele Counties on oats and in grassy alfalfa. Armyworm was not important for the rest of the season. Counts on corn in IOWA decreased from 20-40 per square foot in 1969 to less than one per square foot in 1970.

Armyworm built up as early as late May in the southern half of ILLINOIS, but numbers never reached an economically damaging peak. Larvae averaged as high as 9 per linear foot in an occasional field in Champaign and Douglas Counties. Most counties had a maximum of less than 3 larvae per linear foot. About 13,300 acres of wheat were treated for armyworm in 1970. This was about two-fifths of the total acreage treated in 1969. Armyworm was a minor problem on corn in Illinois, with no serious infestations reported. Only 8,300 acres of corn were treated this year compared with 492,000 acres in 1969. First-generation armyworm larvae damaged corn in a few fields in west-central and southwest INDIANA by May 28. Barley heads were clipped by June 12 in a limited area of the southwest district. Armyworm was found in all districts by June 5, but numbers were seldom economic. The second generation, which was so conspicuous in 1969, was present in noneconomic numbers (second instars) in grasses as early as July 24 this year. Blacklight trap collections indicated a fairly heavy flight at the end of April. Moth collections peaked June 21-27, with counts of 2,000+ in northwest and southwest area traps. In MICHIGAN, larvae were light in a few scattered fields of corn and small grain in the southwest area. Control was effective. Moth collections did not show increases until late summer, which was too late for damage to wheat and oats. In OHIO, the first armyworm moth emergence of the season occurred April 23. Populations gradually increased to a peak near the end of May. Larval damage reports were few and these were limited to no-till corn during early June. Damage to these fields was severe.

Armyworm was not a problem in NEW YORK, even on untreated sweet corn. In DELAWARE, moths were very numerous by early May in blacklight trap collections. Larvae heavily damaged barley, wheat, and corn in some areas of Kent and Sussex Counties in late May and early June. Adults were again very numerous in all areas of Delaware during late June and early July. Armyworm infestations on small grain in MARYLAND were below normal for the third consecutive year. Infestations in early corn were generally light, although an estimated 1,500 acres of no-tillage corn required controls during June. With the future increases in no-tillage corn practices, armyworm damage is expected to increase in Maryland. Larvae caused

severe, economic damage to sod-planted seedling corn in VIRGINIA. Damage was reported by the third week of May in Amelia, Lancaster, Franklin, Pulaski, Spotsylvania, Powhatan, Montgomery, Cumberland, and Smythe Counties, and at Virginia Beach. Damage was also severe in Craig, Rockingham, and Montgomery Counties. In Grayson County, 90 percent of all no-till corn required spraying. The overwintered armyworm generation pupated in Montgomery County during the third week of June and moths had emerged by the fourth week of June. Larvae were first reported damaging rye, barley, oats, and wheat May 20 in Accomack and Northampton Counties on the Eastern Shore of Virginia. Most infestations were in connection with fields to be used for sod-planted corn.

Armyworm moth catches were heavy in blacklight traps in WEST VIRGINIA. Peak collections occurred the second week of July. Damage to sod-planted corn was reported to range from 10 to 20 percent in Hampshire, Hardy, Pendleton, and Hancock Counties the last week of June. Armyworm infestations on small grains occurred later and damage was less than usual in Calhoun County, SOUTH CAROLINA. There was enough larval damage to affect yields. This was the only location armyworm was reported on small grains in the State. In ARKANSAS, armyworm was the only economic pest on small grain. A small acreage of wheat was treated in Lee and St. Francis Counties in May. Larvae were collected from pastures in south-central MISSOURI in early April. Counts ranged 4-18 per square foot of fescue, orchard grass, and brome grass in the western areas. Damage was most severe to fescue and seed fields of orchard grass in the southwestern part of the State.

ASTER LEAFHOPPER (Macrosteles fascifrons) was moderate to heavy on small grains in OKLAHOMA during October and early November in the northwest, north-central, southwest, and south-central districts. Adults infested roadside grasses and alfalfa in NORTH DAKOTA the first week of June. Populations were still light but widespread on alfalfa by the third week of June. However, counts had increased to 1,000 per 100 sweeps in flax, barley, oats, and wheat by the first week of July. Counts of 2,000 per 100 sweeps were present in Cass and Traill Counties in mid-July. Controls were unsatisfactory. Damage was evident in the more heavily infested barley. Aster yellows disease was not reported in flax in North Dakota in 1970. Aster leafhopper first appeared in MINNESOTA on April 27 in Dakota County. By the week of May 25, this pest was found along the Canadian border. Counts were over 1,000 per 100 sweeps in late May on alfalfa and small grain in the southern half of the State and in early June in the northern counties. In spite of heavy populations and aster yellows disease in 8 percent of the leafhoppers collected in late May, the potential disease problem equal to the 1957 outbreak did not occur. Populations remained heavy throughout the season on small grain, alfalfa, and flax. The incidence of aster yellows disease was not heavy in flax, small grain, potatoes, asters, and some vegetable crops, seldom exceeding 3 percent in flax. In WISCONSIN, aster leafhopper adults were first swept from rye on April 24. By May 1, counts per 100 sweeps in small grains ranged from 1 in southwest and central districts to 6 in Dane and La Crosse Counties. The population in Dane County had increased to 15 per 100 sweeps by May 8. Counts per 100 sweeps for other areas by May 23 were: Southwest 35, central 8-12, and southeast 4. These were about the peak counts in grain throughout the season. Populations were generally kept at a minimum by controls in commercial plantings of carrots, lettuce, celery, and onions but an estimated 4 percent of these crops became infested with aster yellows disease, resulting in an estimated loss of about \$50,000. Aster leafhopper populations were moderate in MICHIGAN. Disease infectivity was 5 percent or less. In NEW YORK, counts were substantial in all carrot fields surveyed, but aster yellows disease was only a problem (up to 45 percent infection) in a few areas.

BEEF LEAFHOPPER (Circulifer tenellus) surveys in IDAHO on April 20 indicated populations were less than in 1969. Host plants were less widespread and in poor condition. Leafhoppers migrated into southwestern area fields between May 24 and 31. Counts peaked at 48 per 100 sugar beet plants at Castleford and Buhl, Twin Falls County, June 19-24. Populations in the south-central and western areas were



lighter than in 1969. Curly top disease caused economic damage only in very late-planted sugar beets and beans that were located near leafhopper breeding areas. Populations in UTAH were light on sugar beets and table beets. However, there was some injury to the seed crop in Washington County. Numbers on tomatoes were generally light. Plant loss ranged light to moderate in the central area, and averaged 25 percent in Washington County. Overwintered beet leafhopper adults averaged 12 per 100 square feet in the Worland Valley of Washakie and Big Horn Counties, WYOMING, in late April. A total of 7,456 acres of wasteland were treated. No beet leafhoppers or curly top disease were detected for the rest of the growing season in Wyoming.

CORN EARWORM (*Heliothis zea*) larvae were especially abundant in sweet corn ears during late spring and early summer near Belle Glade, Palm Beach County, FLORIDA. In some unsprayed plots, 99-100 percent of the ears were damaged. Larval populations and damage were heavy during spring and summer in St. Johns County and controls were difficult. Untreated sweet corn plots had 100 percent infested ears during early June at Sanford, Seminole County. Populations were light on untreated sweet corn during early June at Zellwood, Orange County. Larvae were extremely light on soybeans from Gainesville, Alachua County, to Jay, Santa Rosa County. In ALABAMA, larvae were widespread and damaging to pretassel corn and sorghum and to corn ears in the milk and dough stages. First-generation larvae infested crimson clover, vetch, and other winter legumes during March and April. Corn and grain sorghum supported populations which in turn caused later populations to be serious pests of peanuts, soybeans, and other crops. Corn earworm has become one of the major pests of soybeans in south Alabama with only slight damage in the central and northern areas. Controls were applied to about 195,000 acres of soybeans. About 2 applications of insecticides were made at a cost of \$780,000. Larvae damaged soybeans in SOUTH CAROLINA, particularly in those fields planted late. However, some infestations in previous years were heavier. Corn earworm damage was minimal to peanuts. Populations were present throughout the season on field corn. Counts on early corn were average, but increased progressively until damage approached 100 percent.

Corn earworm larvae were damaging to whorls of early planted corn about June 19 in west TENNESSEE. Damage was light until about mid-July. Surveys indicated damage was moderate in many locations throughout the State. Damage was heavy to whorls of late-planted corn by late July and to ears of earlier planted corn in many areas. Controls in some cases were not effective. During August, a few damage reports were received, but controls were ineffective by this time. Because corn was too high and controls could only be made by aircraft, none were applied. Corn earworm caused economic damage in NORTH CAROLINA in about 20 percent of the late-planted soybeans or in late maturing varieties in Johnston, southern Wake, Nash, and Edgecombe Counties. Larval counts of 20 per 5 row feet were noted in some fields. Damage may have been higher in late-maturing fields where fungi did not reduce populations. Early maturing soybeans generally escaped damage. In VIRGINIA, heavy moth populations in late August produced widespread larval infestations on peanut foliage in Sussex, Southampton, Nansemond, and Isle of Wight Counties. However, rainy weather and chemical spray programs caused a sudden decline in numbers the first week of September. Larvae had ranged up to 82 per 100 sweeps. Infestations were not economic. Larval damage to soybeans was spotty. A few soybean fields in Middlesex, Gloucester, and Lancaster Counties, Virginia, had 50 percent of the beans cut during the second week of September. Some fields of late-maturing soybeans in Nansemond County suffered 25 percent cut beans, but statewide damage was generally light. First corn earworm injury on corn was detected in Brunswick County June 6. Larvae were found boring in whorls as far north as Amherst and Loudoun Counties by mid-July. Infestations increased until many cornfields in the southern Piedmont and Tidewater sections averaged 30-40 percent of ears infested by late August. Moth flights were extremely heavy in Nansemond County and moderately heavy in Richmond, Prince George, and Charlotte Counties the third week of August, resulting in large numbers of larvae on peanuts but not on soybeans. Larval damage was lighter in the Eastern Shore of Virginia than in 1969. Thirty-five

percent of untreated tomato fruit and 95 percent of untreated sweet corn were infested. In Virginia, it is unusual for 5 percent of the untreated sweet corn to be uninfested.

Corn earworm infestations in corn, soybeans, and tomatoes in MARYLAND were well below the 1969 3-year record high. Heaviest infestations on corn ranged 10-16 percent in late June in Wicomico County and by August 3, averaged 15 (ranged 6-40) percent. Corn averaged 20 percent infested in most fields statewide. First and second instars infested snap beans and lima beans in late August. Controls prevented economic damage to late season sweet corn, lima beans, and snap beans. Infestations in soybeans stayed below economic levels during August and September. Heaviest counts ranged 1-2 per 10 row feet on September 11. Corn earworm larvae destroyed 150 bushels of dug sweetpotatoes on the ground in Wicomico County before they were shipped to market. Larvae were present on foliage before digging. First corn earworm moths were collected in blacklight traps the second week of June in DELAWARE, but collections remained light until late August, when averages were 35 per night. Moth flights were abundant in most areas during early September. Corn earworm moth collections in blacklight traps were significantly lower than during 1969 in NEW JERSEY. Increases in larvae and damage in fresh market ears were widespread in late August and September. Injury to fall lima beans was minor compared with the heavy damage in 1969. No damage was reported from fields which received scheduled insecticide applications. Corn earworm infestations on fall lettuce in Cumberland County, New Jersey, were lighter than in 1965 and 1969. A few larvae were found in harvested heads during early October. Grower awareness and rigid control schedules prevented widespread losses. Moths were first collected in Cumberland County during the last week of May. These moths probably originated from the few pupae that succeed in overwintering each year in southern New Jersey. Beginning August 19, moth counts increased sharply and remained abundant until September 27, when sudden cool weather significantly reduced moth activity and lowered counts. Peak moth counts of 54 per night occurred September 25, 26, and 27, in Cumberland County. This pest did not make an appearance in NEW YORK until August. Infestations of corn ears increased slowly in successive plantings to about 5-25 percent, where untreated in middle to late September. Treatments applied at intervals of 72 hours on the silks were satisfactory. Corn earworm infested 10-20 percent of the ears in a few scattered fields of sweet corn in MAINE. Statewide infestations ranged 1-5 percent. The heaviest infestation occurred October 1, which is unusually late in Maine.

Corn earworm larvae were first observed in a few whorls of corn June 15 in central INDIANA. This noctuid did not develop as a pest in the State in 1970, and losses decreased to 0.4 percent from the low level of 1969. Most losses occurred in very late-planted corn. The first moth was taken June 17 in a blacklight trap in the southwest district. Peak totals during the period September 20-26 by district were: South-central 614, southwest 386, and northwest 158. In MICHIGAN, a corn earworm moth collected June 26 at a blacklight station in Van Buren County indicates the possibility of a small overwintering population in the State. Past records show the earliest adult capture to be March 31 in Livingston County. The main migratory flight arrived almost one month later than the August 20 of past records. A single adult was recorded September 1 at the Lenawee County blacklight station and 132 during the period September 22-25. Collections were sampled as far north as Frankfort, Benzie County, where counts were extremely light in field corn. Corn earworm damage to late sweet corn was scattered in Lenawee and Monroe Counties. The 1970 growing season was one of little overall damage and generally light infestations throughout Michigan. Corn earworm was heavier in ILLINOIS than for the past five years. Larvae damaged green beans and sweet corn, and occasionally field corn. Corn earworm moths first appeared in WISCONSIN near the end of June and flights continued light throughout July and August. Counts were heavy by late August, but ranged one-half to one-sixth of the populations present at the same time in 1969, when corn earworm and Spodoptera frugiperda (fall armyworm) required additional controls on canning corn. In IOWA, corn earworm infestations in corn ears increased from 0.3 percent in 1969 to 3.7 percent in 1970.



The corn earworm moth flight period in NEBRASKA extended from June 14 to October 16 at Lincoln, Lancaster County, and from May 24 to September 24 at Concord, Dixon County. Counts were light until mid-August, when collections increased sharply. Large flights peaked at both locations about September 4 and October 2. Larvae damaged sweet corn in mid-July, when up to 40 percent of the ears were infested in Lancaster County. Larvae in field corn infested less than 1 percent of the plants in 20 Hall County fields on August 7 and in 44 Dawson County fields the first week of September. Although infestations in field corn generally remained light, populations increased over those of 1969. Moth collections increased sharply about August 10 in blacklight traps in Brown and Riley Counties, KANSAS, and continued into mid-September. Moth catches peaked about September 8, with one night's catch of 202 in Brown County and 186 in Riley County. Larvae ranged up to 10 per 100 ears of field corn in late July and early August in Stafford, Grant, Cheyenne, and Thomas Counties. Larvae averaged 50-90 per 100 ears in fields in Brown, Geary, and Stafford Counties in mid-August, and ranged up to 20 per 100 ears in Greeley and Wichita Counties in late August. Populations were relatively heavy in ears of late-planted corn surveyed in late August and early September in Riley, Wabaunsee, and Brown Counties, where counts ranged 100-300 per 100 ears. There were few reports of corn earworm damage to sorghum during the growing season. Estimates indicate that about 11,300 acres of sorghum were treated in Kansas. Most treated acreage was confined to counties in the eastern crop reporting districts (9,300 acres). Generally, corn earworm caused little damage to soybean pods, but about 500 acres were treated in Crawford County. An estimated 17,000 acres in Coffey, Chautauqua, Crawford, and Labette Counties needed treatment with 15,000 of these acres being in Chautauqua and Crawford Counties. Larvae were sometimes found during November in alfalfa sweepings in Wabaunsee, Shawnee, Anderson, Sedgwick and Sumner Counties, Kansas.

Corn earworm larvae and Spodoptera frugiperda (fall armyworm) larvae caused some ragging of leaves on young sorghum in ARKANSAS. Corn earworm is the third most important pest of grain sorghum in the State. Noneconomic infestations were common in all areas. A relatively small acreage in Lawrence and Independence Counties was the only known acreage treated. Corn earworm is the number one insect pest of soybeans in Arkansas. In OKLAHOMA, counts on alfalfa ranged 5-10 per 10 sweeps in Jackson, Muskogee, and Wagoner Counties, and as high as 20 per 10 sweeps in Jackson, Tillman, Kiowa, Stephens, and Payne Counties from late September through mid-October. Damage to corn by corn earworm ranged moderate to heavy in July in Mayes, Craig, and Greer Counties, and light to moderate in Nowata, Cleveland, Choctaw, Beaver, Texas, and Cimarron Counties. Damage to sorghum heads ranged light to occasionally moderate statewide from July through September. Populations on peanuts were moderate in Bryan County during September.

Corn earworm damaged corn more than any other crop in ARIZONA during 1970. Control was difficult and there was an average of one larva in practically every ear. Most damage occurred after silking in Maricopa, Graham, and Cochise Counties. Some damage occurred on alfalfa and lettuce. In CALIFORNIA, corn earworm caused heavy damage to field and sweet corn, necessitating extensive controls. Infestations first began in Imperial County in May and were statewide until November. Corn earworm was light to moderate on sweet corn in central UTAH and moderate on this crop in the southern portion of the State. Populations on corn in IDAHO were heavier than usual by the third week of July. Larval-infested ears were up to 12 percent in some Canyon County fields, 90 percent on July 28, and 10 percent on August 6, and 50 percent on August 10 in experimental plots at Parma. Larvae infested all untreated sweet corn seed ears in Canyon County by September 10.

CORN LEAF APHID (Rhopalosiphum maidis) was widespread and damaging to corn and sorghum in CALIFORNIA, but was not as general as in 1969. In NEVADA, populations of corn leaf aphid and Schizaphis graminum (greenbug) yellowed barley in Clark County beginning in mid-April. Several fields required treatments, but populations in other fields were reduced to trace levels by predators and parasites. Controls for corn leaf aphid were required in Churchill, Lyon, and Pershing Counties in late June and early July. Corn leaf aphid infestations were light to moderate on corn throughout UTAH. Spring barley was damaged in several counties.

This pest first appeared in WYOMING August 4 in Goshen County. Counts were light on corn throughout the year. Corn leaf aphid was found on sorghum throughout the Arkansas Valley of COLORADO, but no controls were needed. In NEW MEXICO, a few wheatfields in the southern and eastern counties required controls. R. maidis did not significantly reduce yields of wheat or barley in New Mexico. Corn leaf aphid was heavy on grain sorghum in Zavala County, TEXAS, during mid-April. Counts increased during early May in the south-central area. These infestations declined during late May, but increased throughout the north-central, Rolling Plains, Trans-Pecos, and Panhandle areas in early June. Populations were heavy in many High Plains counties during late June, but declined during July. Corn leaf aphid appeared on young sorghum in Payne County, OKLAHOMA, in mid-May. Counts were heavy by early July on sorghum in most southwestern counties and on corn in Alfalfa County, through July in the southwestern area, and during late July and early August in the Panhandle and in Craig County. Populations declined after the first week of August, mostly due to plant maturity. Light counts, mostly on late forage sorghum, continued through early September. Counts of 300-400 per plant were on broomcorn in Stephens County in late July.

Corn leaf aphid was generally light on KANSAS corn. However, reports indicated about 12,600 acres of corn were treated in Brown, Riley, Morris, Bourbon, Rice, Sedgwick, Kiowa, Decatur, Wichita, Gray, and Hodgeman Counties. Severe infestations were noted on sorghum during late July in Marshall and Finney Counties. Plants showed much chlorosis of terminal and upper leaves along with necrotic areas. Most infestations were light to moderate. Reports showed about 90,000 acres were treated, mostly in the southwest district (56,000 acres) and particularly in Finney, Gray, Seward, and Stevens Counties. On wheat throughout November, corn leaf aphid was light in counties surveyed in all crop reporting districts. Up to 45 per drill row foot were found in Chautauqua County, Kansas. Corn leaf aphid infestations in NEBRASKA were light on corn throughout the season. Colonies of 5-125 aphids per plant infested up to 80 percent of the sorghum plants surveyed in Phelps and Gosper Counties June 22-24. During the last half of July, light counts on grain sorghum in Saunders and Lancaster Counties increased sharply. By July 10, counts of 125-1,500 per whorl infested nearly all sorghum in Seward County and some browning of the flag leaves was evident. By July 17, numbers on grain sorghum had peaked and declined. Counts in Lancaster, Saunders, Cass, Seward, and York Counties averaged 250 per whorl. Populations were negligible on small grains in Nebraska. In NORTH DAKOTA, corn leaf aphid colonies were heavy, with 5,000 aphids per plant on tasseling corn in late July in Richland County. Heavy honeydew on tassels may have affected pollination. Mixed populations of corn leaf aphid and Macrosiphum avenae (English grain aphid) occurred in Walsh, Pembina, Grand Forks, and Traill Counties, with up to 150 per plant on barley and up to 50 per head on wheat by mid-August.

Corn leaf aphid populations were generally low and noneconomic throughout ILLINOIS. Counts peaked in late July and declined rapidly, apparently caused by an internal parasite. More importantly, the infestation did not occur until plant development was beyond the stage most favorable for optimum aphid reproduction and survival. About 71,000 acres were treated specifically for corn leaf aphid. Most of this treatment was probably unnecessary. Corn leaf aphid alates, occasionally with young, were observed in east-central INDIANA on corn, and were heavy on some plants in a grain sorghum field by July 31. Most of the corn in the southern fourth of the State was still uninfested by July 10. However, some of the remaining plants, especially in the southeast area, had heavy whorl infestations. Infestations declined to 20 percent by fall. Corn in the southeast area showed a significant increase in total infestation and in plants moderately to heavily infested. No economic infestations were reported on corn in Indiana, but some sorghum required treatment. Populations of R. maidis were heaviest statewide in OHIO during last of July. About 75 percent of the field corn was infested. Most damage noted was to developing tassels. In WISCONSIN, populations were light enough during the pollination period that growers were unconcerned. As the corn leaf aphid population increased, growers were more concerned with drought.



Corn leaf aphid nymphs ranged up to 2,000 per corn tassel in Oxford, Franklin, Kennebec, and Penobscot Counties, MAINE, the first week of August. By the third week of August, 5 percent of the aphids were parasitized by wasps and 10 percent had succumbed to fungus diseases. During this same period, lady beetles increased to 1 adult and 2 larvae per 10 corn plants. By September 7, 97 percent of the aphids infesting corn were dead. Corn leaf aphid was first noted in NEW YORK on grasses and on whorls and green tassels of corn during late June. Infestations were moderately heavy in summer and required occasional applications of aphicides. Maize dwarf mosaic disease became general on corn after aphids had multiplied and spread into the plantings in July and August. Corn leaf aphid could be found in every sweet corn planting in western New York and in many cases was so prevalent that control treatments were necessary. This aphid was abundant and troublesome throughout NEW JERSEY by mid-August. Yields were not affected; however, their presence on fresh market ears lowers consumer quality. Corn leaf aphid populations on corn in MARYLAND were slightly heavier than the low levels of 1969. No economic damage was encountered, although heavy infestations ranged up to 100 percent in many Frederick, Carroll, and Montgomery County fields. This pest was heavy throughout ALABAMA, and especially in central and northern areas. Maize dwarf mosaic disease again appeared and was general throughout the area. In ARKANSAS, corn leaf aphid caused concern among some sorghum producers, but treatment was not necessary as infestations were noneconomic.

GREENBUG (Schizaphis graminum) was absent from small grains in MICHIGAN and WISCONSIN, but did cause extensive damage to occasional lawns throughout central ILLINOIS. Infestations on grain sorghum in SOUTH DAKOTA followed the pattern of the previous 3 summers, except they appeared 3 weeks earlier than in 1969. Infestations occurred from Clay County in the southeast, north to Brookings County, and west to Haakon, Lyman, and Tripp Counties. Nearly 100,000 acres of grain sorghum were treated in July and August and another 110,000 should have been treated. Losses in untreated fields where lower leaves were killed amounted to yield reductions of 10-40 percent. Greenbug was found in trace numbers on wheat in October and early November in south-central South Dakota. Populations did not become economic as in 1967 and 1968. In NEBRASKA, only 13 greenbug specimens were taken in a suction trap at Lincoln, Lancaster County, during the entire trapping period. Numbers remained negligible or light in wheat examined through maturity and harvest. First reported damage to grain sorghum was in Lincoln County June 4. By late June, colonies had reached counts of 2-60 per lower leaf on 10-60 percent of the plants in fields in Phelps, Gosper, Saunders, and Lancaster Counties. During the first half of July, greenbug ranged 0-1,100 (averaged 200) per lower leaf with 1-3 lower leaves dead on scattered sorghum in Lancaster, Saunders, Cass, Seward, and York Counties. Parasitism was well below 1 percent, but predators began to increase rapidly. Greenbug peaked the last week of July, when up to 6,000 per plant infested several sorghum fields in Lancaster, Gage, Jefferson, Thayer, Webster, Saunders, and Franklin Counties. Parasitism was estimated at 1 percent. Greenbug counts decreased in east, central, and southeast Nebraska by August 7, due to hard, driving rain and severe winds, and to increasing parasitism by Lysiphlebus testaceipes (a braconid), which ranged 5-25 percent. Some damage occurred to scattered fields of sorghum in the southwest, panhandle, north, and northeast districts of Nebraska into the third week of August, as parasites were somewhat slower to overtake aphids in these areas. Greenbug populations were light to moderate on sorghum in MISSOURI, but counts ranged 20-3,000+ per plant in the western area during August. In ARKANSAS, greenbug was reported for the first time in Greene, Jackson, and Poinsett Counties, but infestations were noneconomic. Populations increased to a high of 1,000 per leaf in one Washington County field which was treated in early August. This pest was first found in Arkansas in 1969.

Greenbug was light on wheat in Pottawatomie, Jackson, Nemaha, Allen, Lyon, and Osage Counties, KANSAS, from middle to late January, and from early to mid-February in Greeley, Meade, Atchison, and Ottawa Counties. By late March, counts per row foot ranged up to 300 in Comanche County, 70 in Barber County, and 20 in Clark County. Few lady beetles and parasites were noted in Comanche and Clark Counties. Early in April, greenbug ranged 200-2,000 per row foot in Comanche County, 10-1,200 in Clark County, and 2-40 in Barber County. Parasitized aphids were found

in these counties, with up to 20 per row foot in Comanche and Clark Counties. Predators were also present in some fields. Greenbug appeared to decline on wheat in Comanche and Clark Counties by mid-April, probably due to predators and parasites primarily. Statewide surveys conducted from January to late May revealed no serious infestations in other counties. During November and December, heaviest greenbug populations were 27 and 30 per row foot of wheat in Montgomery and Labette Counties. An estimated 1,125 acres of wheat were treated in Barber, Kiowa, Decatur, and Sheridan Counties. In late July, surveys in 6 crop districts showed high greenbug counts of 570 per plant on sorghum in Kearny County, 240 per plant in Finney County, and 800 per plant in Geary County. Controls were applied in Rawlins and Finney Counties. Populations continued to increase in scattered fields early in August. Counts per plant were 1,400 in Geary County, up to 730 in Chase County, up to 1,000 in Trego County, and up to 970 in Cheyenne County. Most fields had fewer than 300 per plant. Predators and parasites were generally numerous in all areas surveyed. Much treating was underway by early August in western Kansas. By mid-August, greenbug began to decline in Riley and Geary Counties, primarily due to predators and parasites. In a few fields, greenbug remained heavy despite heavy predator and parasite populations. By August 21, greenbug appeared to be decreasing in all areas of Kansas. Observations during August indicated that due to drought, greenbug caused little firing of sorghum and that the heaviest populations were apparently limited to irrigated sorghum or sorghum with lush growth. Controls were applied to an estimated 400,000 acres of sorghum, about 70 percent of which was in the 3 western crop districts. Acreage treated in Kansas in 1970 was less than in 1968 and 1969.

Greenbug populations on small grains were reduced in most areas of OKLAHOMA by cold weather during mid-January. Counts in the southwest area increased to 50-200 per linear foot by mid-February. By early March, populations ranged 200-2,000 per linear foot in Kiowa, Greer, Jackson, Tillman, and Washita Counties. Controls were started in most areas. Counts were heavy in scattered fields in Woods, Major, and Noble Counties during March and in Texas County during mid-April. By early April, counts declined in most areas, except in the Panhandle, due to parasitism by Lysiphlebus testaceipes (a braconid). Greenbug was found through the middle of May in the panhandle area, but only into early May in the rest of State. Greenbug first infested sorghum in Jackson and Tillman Counties in early June. Parasites and predators kept counts generally light through mid-July. Counts ranged 500-2,500 per plant in Jackson, Payne, Texas, Cimarron, Ottawa, and Coal Counties during late July and early August, and declined after mid-August. Parasites and predators were most important in western counties, but hot, dry weather was probably more important in eastern counties. First fall infestations were reported in Noble County in late October. Counts of 1-10 per linear foot were found in scattered fields in the western half of Oklahoma during November and in the eastern half by early December. Counts reached 100 per linear foot in Custer and Washita Counties by early December. In TEXAS, greenbug was damaging grain sorghum in San Patricio, Jim Wells, and Uvalde Counties by April 10. Infestations were found in the south-central area, including Zavala, Live Oak, and Gonzales Counties, within the following 7 days. Greenbug was noted damaging seedling grain sorghum in Williamson County during May, and about 400 acres were replanted near Georgetown. Increased populations were noted in High Plains and Trans-Pecos counties by late June; however, numbers declined in mid-August in these areas. Greenbug increased on small grains during January in the Rolling Plains near Vernon, Windham County, but remained static throughout January in other areas due to cold weather. Infestations were light to medium throughout the north-central area, and generally light throughout southern and eastern areas during early February. Infestations remained heavy in the Rolling Plains until mid-April. Populations throughout the State decreased during late April due to increasing numbers of beneficial insects in small grain. Greenbug was first noted by the second week of June in COLORADO. Populations in many small grain fields ranged up to 600 per plant by the first week of August. However, by the first week of September, populations were controlled by Lysiphlebus testaceipes (a braconid). A complex of predators early in the season helped



reduce populations. Damage was heaviest in Crowley and Otero Counties. In north-eastern Colorado, damage was light to moderate, but extensive controls were applied to sorghum in Yuma County.

Scattered economic greenbug infestations were noted on grain sorghum in Curry, Roosevelt, and Lea Counties, NEW MEXICO. Infestations were not generally distributed as during 1968. Treatments were required in some fields of wheat in southern and eastern counties, but greenbug caused no significant yield reductions of wheat and barley in 1970. Surveys in ARIZONA showed greenbug to be very light in early planted small grains and sorghums until "headed out." Late-planted fields in Cochise, Maricopa, and Pinal Counties were heavily infested and many required treatment. Johnson grass remained the prime host and in most instances had heavier counts than sorghum growing nearby. In CALIFORNIA, greenbug was prevalent and in some cases damaged corn and sorghum. Control was better as growers have learned how and when to treat. This pest was found in scattered locations on cereal grains early in the season.

Greenbug and Rhopalosiphum padi caused moderately heavy to severe damage to about 10,000 acres of newly emerged, fall-planted wheat in Franklin, Benton, and Yakima Counties, WASHINGTON. Most damage was apparently caused by greenbug. There are no records of greenbug being a serious pest in Washington. About 15,000 acres had been treated and an estimated 30,000 acres required treatment during late fall and winter. Egg-laying females were present late in the season, indicating further problems during spring 1971, regardless of the severity of winter.

PICKLEWORM (Diaphania nitidalis) larvae severely damaged 90 percent of 200 squash plants near Tampa, Hillsborough County, FLORIDA, during early June. This pest infested squash in Oconee County, SOUTH CAROLINA, by July 15. Infestations in pickling cucumbers started to increase after July 15 in Dillon County. In NORTH CAROLINA, pickleworm infestations in cucumbers were more severe than usual late in the season, possibly due to laxity of control programs.

POTATO LEAFHOPPER (Empoasca fabae) was first observed in MINNESOTA on May 19 in Wabasha County, but probably arrived in early May in the southeast district. Counts of 200-500 per 100 sweeps were common on alfalfa in all districts throughout the growing season. In WISCONSIN, adults began appearing in heavier than normal numbers the last week of May. Counts were heaviest in the southeastern area. By the time nymphal development was underway, there was some treatment of alfalfa in Sauk County. Populations in second-crop alfalfa did not develop to any appreciable degree. Potato leafhopper was numerous on Norway, sugar, and Swedler maples in southeast Wisconsin and distorted shortened internodes were apparent. Potato leafhopper caused some damage in a few beanfields in Clinton and Kent Counties, MICHIGAN. Populations were light in nearly all other fields. Potato leafhopper counts in alfalfa ranged from occasional specimens in early May to about 5 per sweep in northern INDIANA. Distribution was fairly uniform throughout the State. Populations did not reach economic levels in soybeans. Potato leafhopper was not economic on soybeans in ILLINOIS. Fields surveyed in the south-central two-thirds of the State showed a high count of 3.1 per sweep in Fulton County. The State average was 0.9 per sweep. In OHIO, migrating populations began building up early in June. Damaging levels were reached in late June and damage to second-crop alfalfa occurred. Severe stunting was reported in only one field. Generally populations ranged 1-6 per sweep during peak feeding activity. Damage to third-cutting alfalfa was heavy in northern Ohio during August.

Potato leafhopper populations did not reach economic levels in NEW YORK, although numbers increased rapidly early in the season. Little chemical treatment was applied. This leafhopper was again destructive to new alfalfa seedings in PENNSYLVANIA. The present trend of establishing alfalfa by early spring seeding without a companion crop apparently favors buildup of leafhopper populations in these fields by mid to late summer. Potato leafhopper damage to alfalfa has continued to decrease in the past 4 years throughout MARYLAND. Early cuttings and

heavy rains accompanied by rapid growth of alfalfa have been responsible in part for the decline. In 1970, infestations first appeared in Montgomery and Frederick Counties by June 23. Heaviest counts ranged 1-4 per sweep. Populations increased slowly and peaked in early July with 5-14 per sweep. Potato leafhopper disappeared from alfalfa about August 24. Potato leafhopper counts on alfalfa in NORTH CAROLINA peaked during July and August. Yellowing often occurs but growers do not consider the loss worthy of treatment.

POTATO PSYLLID (Paratrioza cockerelli) damaged commercial plantings of potato and tomatillo plants at a few scattered locations in CALIFORNIA. Adults were first collected on Lycium sp. May 20 in Goshen County, WYOMING. Adults were heavier than in 1969. Timely applications of insecticides resulted in little damage to potatoes from psyllid yellows disease. This psyllid was damaging to potatoes in Washington County, UTAH, but was light elsewhere. Adults of potato psyllid appeared about mid-May in COLORADO, and eggs were observed on matrimony vine by late May. Populations were heavy (up to 12 per 100 sweeps) in potato fields in Morgan and Weld Counties the first week of June. Planned controls kept populations light. Losses were light to moderate. This species and Trichoplusia ni (cabbage looper) were the major pests of tomatoes in Prowers, Otero, and Pueblo Counties, Colorado. Planned controls held populations in check.

SPOTTED ALFALFA APHID (Therioaphis maculata) was found on alfalfa in Carter, Fallon, and Wibaux Counties, MONTANA, during 1969, but surveys conducted in adjacent counties during 1970 were negative. Infestations of this aphid in WYOMING remained light and noneconomic during the 1970 growing season. However, infestations were found for the first time in Fremont, Johnson, and Sheridan Counties. Spotted alfalfa aphid appeared on alfalfa in the Arkansas Valley of COLORADO during the week ending July 25, when counts ranged up to 30 per 100 sweeps. By late August, populations ranged 0-1,800 per 100 sweeps in this 5-county area. Infestations appeared later than usual in UTAH, but about 2,000 acres of alfalfa in Millard County required treatment. Spotty damage by this pest occurred in Beaver and Washington Counties.

Spotted alfalfa aphid averaged up to 4 per stem on alfalfa hay in southern Nye County, NEVADA, during April and May. Infestations were most prevalent in fields infested with Tetranychus spp. (spider mites). Spotted alfalfa aphid built up in many prime alfalfa-producing areas of ARIZONA during the year. Infestations were present in several fields from mid-October through December with counts ranging 1,800 to 3,000 per 100 sweeps. A peak of 6,500 per 100 sweeps was reached in one field in late October. Treatments were necessary in many seedling fields and established stands of alfalfa in Parker Valley. Populations were heavy in many fields from January through March and from October through December in Yuma County, Arizona. Spotted alfalfa aphid necessitated controls on alfalfa in NEW MEXICO, but caused no extensive losses to this crop in the State.

Spotted alfalfa aphid was heavy on alfalfa in OKLAHOMA during April and May. Heaviest counts ranged 1,500-5,000 per square foot of crown in southwestern counties. Counts also were heavy in Mayes, Kingfisher, and Washita Counties. Summer populations seldom ranged more than 200 per 10 sweeps in any area of Oklahoma. This aphid caused little damage to alfalfa in KANSAS. Limited surveys during late May showed only trace numbers in Atchison, Brown, Doniphan, and Nemaha Counties. Noneconomic populations were found in several counties in the south-central and southeastern districts in early June. No damage was found in alfalfa fields surveyed in 9 counties in the central, south-central, and southwest districts during August except for one established field in Stanton County, where counts averaged 120 per sweep and much leaf shedding and yellowing were evident. Populations were light throughout November in most fields in all crop reporting districts except the west-central and northwest. About 3,150 acres of established alfalfa and 6,000 acres of seedling alfalfa were treated. Most controls were applied in the east-central, south-central, and southwest crop districts of Kansas in 1970.



Spotted alfalfa aphid ranged up to 30 per row foot on seedling alfalfa in Dawson County, NEBRASKA, the first week of September, but damage was not serious. This pest was detected for the first time in Cass County, NORTH DAKOTA. This was the first report of this pest since it was first found in the State in 1962. Spotted alfalfa aphid had built up to 300 per sweep in some isolated fields of alfalfa in WISCONSIN by late August with some damage evident. Counts decreased gradually and averaged 15 per sweep by late September. This aphid was at trace levels wherever it appeared in INDIANA, and continued light in the Gainesville area of Alachua County, FLORIDA.

TOBACCO BUDWORM (Heliothis virescens) remained below economic levels in MARYLAND. Larvae ranged 1-5 per 50 tobacco plants and were present throughout the season. Populations on tobacco in NORTH CAROLINA reached economic levels June 9 at Whiteville, Columbus County, July 8 at Clayton, Johnston County, but failed to reach these levels at Reidsville, Rockingham County, in the northern part of the State. Assuming destruction of 0.1 of a leaf constitutes a damaged plant, the percent of plants damaged by tobacco budworm was 40 at Whiteville, 33 at Clayton, and 17 at Reidsville. Tobacco budworm was the most serious pest of tobacco in SOUTH CAROLINA. Infestations were earlier and heavier than usual. Survey of one field of tobacco showed a 15-percent infestation. This pest was probably more of a problem and for a longer period than in most past years. Mixed populations of tobacco budworm and H. zea (corn earworm) were the most serious tobacco pests in ALABAMA. A very active treatment program by growers kept these pests under control. In FLORIDA, tobacco budworm infestations were moderate to heavy on cigar-wrapper tobacco, but damage was light where controls were applied. This species was again the primary pest of shade-grown tobacco in Florida. Larvae caused much damage in the flue-cured tobacco area, even in treated fields. This pest also damaged 2-7 percent of the pods in 320 acres of bush beans in northern Florida during late May and early June. Larvae ranged 2-4 per plant and damaged flowers and pods of pigeonpeas at Gainesville, Alachua County, during July. Tobacco budworm was found occasionally on soybeans in ARKANSAS, but composed only a small percent of the Heliothis spp. population in the State. Only two of 231 Heliothis spp. larvae collected on soybeans were H. virescens. Infestations were much lighter than in 1969 and were confined to southeast Arkansas. About one-third of the acreage was treated in late August and early September to prevent pod damage. Economic infestations of Heliothis spp. as foliage feeders destroying plant terminals was a new occurrence in the State. A few thousand acres required treatment in Prairie and Arkansas Counties.

HORNWORMS (Manduca spp.) were slightly more numerous on tobacco in MARYLAND than the low levels present during 1969. Most infestations averaged one larva per 50 plants throughout the season. Heavy infestations requiring controls occurred in Charles and St. Marys Counties. Counts ranged 10-20 per 50 tobacco plants in these counties. Second-generation larvae were heavily parasitized (30-50 percent) by Apanteles congregatus (a braconid). Hornworm larval populations were above normal in several isolated tomato plantings in Dorchester and Wicomico Counties. The general population level of TOBACCO HORNWORM (M. sexta) and TOMATO HORNWORM (M. quinquemaculata) on tobacco in NORTH CAROLINA has changed little during the past five years. Infestations were very low in 1970 with only a few fields needing treatment. A larger portion of the general population of these pests was tomato hornworm this year. Moths of this species in light traps increased from 10 percent of the total hornworm catch in 1969 to 44 percent in 1970. Damage by hornworms in North Carolina apparently decreases in a south to north direction. Considering destruction of 0.1 of a tobacco leaf as constituting a damaged plant, the percent of damaged tobacco plants ranged from 55 in the southern part of the State to 27 in the northern area. Five or more large larvae per 5 tobacco plants is considered an economic infestation. Counts reached this level in the southern area on June 9 at Whiteville, Columbus County, but did not reach this level in Johnston and Rockingham Counties.

Tobacco hornworm populations on tobacco in SOUTH CAROLINA have declined greatly in recent years. Buildup during the latter part of the 1970 season was slightly heavier than in recent years. Tobacco hornworm was a special problem on flue-cured tobacco in the Live Oak area of Suwannee County, FLORIDA, this season. Damage was light where sprays were adequate. In untreated plots, flue-cured tobacco was totally infested with 4-9 larvae per stalk and defoliation was complete. Tobacco hornworm was not a problem in the shade-grown tobacco areas of Florida.

Tobacco hornworm caused moderate damage to commercial tomatoes in Tulsa County, OKLAHOMA, in early July and to garden tomatoes in Mayes County in mid-August. In CALIFORNIA, this pest damaged commercial tomatoes and was severe in home gardens on tomatoes and peppers. Tobacco hornworm larvae were very abundant in backyard gardens in the Medford area of Jackson County, OREGON, in early August. This pest necessitated controls in one commercial tomato planting in the same county near Talent.

### CORN, SORGHUM, SUGARCANE

#### Highlights:

EUROPEAN CORN BORER increased in several corn-producing States, but decreases were reported from North Dakota, Kansas, Missouri, Ohio, and Illinois. Some very heavy damage occurred in South Dakota, Nebraska, and Minnesota. SOUTHWESTERN CORN BORER was serious on sorghum in Arizona and corn in northern Alabama. SUGARCANE BORER damaged much sugarcane and FALL ARMYWORM was heavy and difficult to control on sorghum in Florida. BLACK CUTWORM was economic on corn in scattered areas of Nebraska, locally severe in Wisconsin, and was the most important pest of corn in Illinois where it poses a potential threat in 1971. CORN ROOTWORM infestations and damage were heavy in South Dakota and Minnesota. These pests are expected to create some problems in South Dakota, Minnesota, Illinois, and Maryland during 1971. WIREWORMS were troublesome in a few areas. SORGHUM MIDGE damaged sorghum in Missouri, Arkansas, and Florida.

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EUROPEAN CORN BORER (*Ostrinia nubilalis*) adults emerged July 2 in COLORADO. Larvae appeared by the end of July. Confined to the Kiowa Valley in Weld County, larvae ranged 0-1 per stalk and infested 6-10 percent of the stalks. Lodging ranged 10-20 percent with overall loss very light. Controls were used in one field. Winter survival in NORTH DAKOTA dropped from 86 percent in 1969 to 69 percent in 1970. The first moths of the season appeared June 13. Eggs appeared the second week in July. Moth activity was low. Borer counts per 100 plants during fall dropped from 177 in 1969 to 57 in 1970. Very few second-generation larvae appeared. Controls were very seldom applied. In SOUTH DAKOTA, however, overwintering numbers had been high and winter survival in 8 southeastern counties ranged 75-87.5 percent in spring 1970. Larvae in Clay and Yankton Counties infested an average of 80 percent of the corn by July 1-2. Infestation was heaviest in the southeast. In Union County, 80 percent infestations were common. Yield loss from the first generation was probably high, since only 10,000 acres of corn were treated during the critical control period in the first half of July. Unusually heavy, the second generation caused unusually severe ear droppage and stalk breakage. Fall counts in 35 eastern counties increased over those of 1968 and 1969. Unless winter survival is low, damage by the first generation could be excessive in 1971, particularly in the southeastern counties and western Spink and Brown Counties. First European corn borer moths in NEBRASKA were trapped at Lincoln, Lancaster County, on May 22. At Lincoln, the first larval generation appeared June 12, the second generation appeared July 31, and possibly a partial third generation peaked August 30. The first generation was generally light, except for heavy numbers in many northeastern fields. Infestations in Cuming County ranged 47-100 (averaged 77) percent. Some controls were applied in the eastern third of Nebraska. Heaviest in the east and northeast districts, the second generation infested an average of 93.9 percent of the plants in the northeast, east, southeast, south, and central districts. Ear



droppage approached 10 percent in the northeast district. Fall populations were 2.5 times higher than those of 1969 with the largest increase in the northeast, east, central, and south districts. These high numbers indicate a heavy first brood for 1971 if weather favors development. Perezia pyraustae (a protozoan) infected 48 percent of the European corn borer larvae (none in 1969) in Cuming County, and 20 percent (40 percent in 1969) in Hall County. The first larval generation appeared in KANSAS on June 19 when 10-65 percent of the corn was infested in a field in Jefferson County. Second-generation eggs were found on corn in Cloud County by July 24. Many moths of the first generation (525 moths) were taken in a light trap in Riley County on July 29, and of the second generation (1,765) were in a light trap in Brown County August 24. Third-generation eggs, half had hatched, were first found in Brown and Wabaunsee Counties August 29 to September 4. On October 29 an average of 420 half to full-grown third-generation larvae per 100 plants infested very late corn in a field in Wabaunsee County. Overwintering numbers in corn were the lowest since 1967 in the northeast and east-central districts and were about the same in the north-central and central districts in 1970 and 1969. The expected buildup of overwintering numbers may not have occurred because many of the second generation, which normally would have overwintered, produced the third generation, and many of the third generation perished due to the absence of corn that would allow larvae to survive. No damage to sorghum by European corn borer was seen or reported in Kansas.

European corn borer damage is seldom economic in ARKANSAS because of the reduced corn acreage. The first moths in MISSOURI were trapped in Jefferson County on May 13. The percentage of infested plants declined from 75.5 percent in 1969 to 65.9 percent in 1970. The number of borers per 100 plants declined from 235 in 1969 to 119.5 in 1970. In IOWA, 20.6 first-generation larvae per 100 plants infested 17.3 percent of the corn in July. Counts of 241 borers per 100 plants infested 76 percent of the plants during fall. There was a partial third brood. Major loss due to dropped ears ranged from 3.5 bushels per acre in the central area to 15 bushels per acre in eastern and western areas. European corn borer increased in all districts of MINNESOTA except in the northwest district. The largest increase, 455 percent, was in the south-central district. These increased populations were attributed to a large second generation which had been of minor importance in past years. Hot weather caused rapid development of the first generation allowing for an early and successful second generation. Stalk breakage, due to European corn borer feeding and stalk rot disease, was more prevalent and mostly above the ears, but enough occurred below the ears to make some harvesting difficult. Ear droppage was important in some southwest district fields. Overwintering numbers were the highest in over 10 years. A potential for increased problems in 1971 exists, especially in the southwest, south-central, southeast, and west-central districts.

European corn borer overwintered well in WISCONSIN. Pupae appeared May 8, a week earlier than in 1969, but flights were somewhat delayed and the first generation was lighter than anticipated. Conditions favored the second generation. Stalk breakage in field corn was noticeable, but the greatest loss was due to depredations and contamination of canning crops. Most canning companies treated several times and some companies also treated snap beans on a preventive basis. This treatment cost over 0.25 million dollars. Parasites appear to be increasing in Wisconsin. European corn borer was the major insect pest of crops in MICHIGAN. First trapped at Lenawee County blacklight station May 24, moths peaked May 28. Larvae hatched from June 3-5 to June 15. The first generation peaked at 218 moths on August 8. Small flights until October 12 indicated a partial second generation. Larvae were more prevalent on field corn than in the past. Damage was scattered as far north as Gladwin County. The heaviest larval concentration occurred in the southern tier of counties. Very few fields were treated, a few were completely infested, and a few showed much lodging. Fall numbers showed a general statewide increase, averaging 1.42 borers per stalk. Because of the definite increase in numbers from one season to the next, this insect seems to be increasing its adaptation to the Michigan climate. Moths first emerged May 19 in OHIO, and peaked June 1-10, a week earlier than in 1969. Early instars were noticed on June 29.

Infestation levels were higher than expected, and some early planted sweet and field corn required treatment. The second moth emergence peaked August 1-10, a week earlier than in 1969. Moth counts remained high throughout August. The second larval generation appeared September 1. Heavily infested fields (90-100 percent) were found throughout September. Damage estimates are expected to be higher than in 1969. In INDIANA, eggs were found by May 27 on 30-inch corn grown for grain in the southwest district. First-generation larvae were heaviest in the south-southcentral district (57 borers per 100 plants) and in the north-northcentral district (20 borers per 100 stalks), closely followed by the north-northeast district. Percent infestation was 28 in the south-southcentral district and 30 percent in the north-northeast district. Half of the corn was too young for first-generation larvae in the southern districts by July 10. Half of the corn was in green silk in the north-northeast and north-northcentral districts and 22 percent had reached this stage in the north-northwest district by July 24. First-generation European corn borer moths peaked at 6,697 in the south-southwest district blacklight trap August 23-29. Infestations by the second generation declined from 48 percent in 1969 to 41 percent in 1970; the greatest decline was in the southern districts. Overall larval averages per stalk increased somewhat in 1970 over 1969 because numbers in the north-northcentral district were nearly 4 times those of 1969. Winter survival in ILLINOIS during early March was 94 percent; 70-80 percent survival is average. Moths first emerged during the second week in May in the southern third of the State. Egg laying was retarded by several weeks of windy, rainy weather. The first generation had one larva per 100 corn plants. The second generation was also below average. The State average per 100 plants was 85 borers compared with 170 in 1969 and 211 in 1968. About 150,000 acres of corn were treated. Counts on sweet corn in Illinois were lighter in 1970 than in 1968 and 1969.

European corn borer infested early corn in west TENNESSEE by mid-June. Generally light to moderate, counts were heavy only in some western fields. Moths were heavy in blacklight traps in this area and larvae bored into corn ears by mid-August. Much yield loss occurred where heavy numbers lodged early corn. Haywood County was a new county record. Larvae were first reported May 14 in Autauga County, ALABAMA. Counts were lighter than during 1960 to 1966. Corn was infested throughout the northern area. Isolated infestations damaged late corn as far south as Autauga County. Barbour and Escambia Counties were new county records. This pest increased on field corn throughout SOUTH CAROLINA. Damage was noticeable in many fields. On sweet corn, insecticides resulted in 98 percent worm-free ears but 21 applications were needed in Williamsburg, Marion, and Florence Counties. Heavy flights in NORTH CAROLINA indicated possible heavy infestations which did not develop.

European corn borer damage in VIRGINIA was generally lighter on corn in 1970 than in 1969. First injury was reported in Amelia and Charles City Counties during the third week of June. Varying greatly in intensity, infestations were widespread by mid-July. Moth catches were heavy in Nansemond County July 29 and August 25. Lodging was severe and widespread in Warren and other northern counties at harvest. Counts were generally light throughout WEST VIRGINIA. Damage was not economic except on marketed sweet corn. Moth catches were very light with a peak of 68 per night the first week of August. European corn borer infestations in corn remained moderate to heavy throughout MARYLAND. Moths were first active in Caroline, Dorchester, and Somerset Counties by May 25. Young larvae infested 5-45 percent of the corn statewide in mid-June. Second-generation larvae appeared in Talbot, Dorchester, Wicomico, and Queen Annes Counties in mid-July. Infestations ranged 40-100 percent from July through August. Overwintering larvae averaged slightly fewer in 1970 than in 1969. Controls were necessary on 20,000 acres of processed sweet corn. Foliar sprays were not satisfactory due to the short exposure period of first instars. In DELAWARE moths were first trapped in Kent and Sussex Counties May 11 and 12. First and second instars infested early planted field corn in early June, and third and fourth instars were abundant on sweet corn in Sussex County. Some moths emerged by late June and early July. By late July and early August, moths averaged 100+ per night in some areas with fresh egg masses and young second-generation larvae common in corn and other crops. Borers averaged 283 per 100 corn plants during fall.



European corn borer moths laid the first eggs of the season in southern NEW JERSEY during the week of May 22. Moth emergence peaked June 3-14. First-generation larvae were moderate on field corn by mid-June, but yield losses were negligible. Second-generation moths started to increase in southern area black-light traps July 22 and remained abundant until mid-September. Second-generation moth counts were slightly heavier than in 1969. A partial third generation was probably present. Injury to sweet corn was minimized by strict application schedules. European corn borer continued very heavy on field corn, especially no-till corn, in NEW YORK. Infestations were often nearly 100 percent. On sweet corn both generations were abundant in the Hudson Valley, probably surpassing in importance all the other corn insects combined, but were not serious elsewhere. Nearly all commercial plantings were treated, and control was usually satisfactory. In untreated plantings and check plots ear infestations were heavy on corn that had passed the whorl stages in either hatching period, June or August. Ears on late plantings that passed the whorl stages after mid-August were under severe infestation pressure. Untreated plantings were up to 100 percent infested in mid-September, with most ears having entries at 2 or 3 of the zones on the ear (tip, side, or shank). Programs of 8-10 treatments, beginning at mid-whorl, kept the ears in the top grade. Parasitism by Macrocentrus sp. (a braconid) was unusually heavy in the first generation, exceeding 10 percent in some cases. Larvae infested 10 percent of the ears in a field in Washington County, RHODE ISLAND, by September 16. In NEW HAMPSHIRE the second generation was serious on corn. Larvae destroyed 10 acres of sweet corn by lodging the stalks. Larvae were found on silks of late sweet corn. Some problems were caused by the improper use of insecticides. European corn borer infested silage corn from the first part of July through August in southern and western MAINE. Infestations averaged 10 percent in York County, 20 percent in Oxford County, and up to 40 percent in Penobscot County. A strong wind the third week in August broke off 5 percent of the corn plants in a 20-acre field near East Corinth, Penobscot County, indicating a heavier infestation than in 1969. About 22,000 acres of silage corn were involved. Many fields of sweet corn were sprayed too late; 30 percent of the corn in most plantings were infested by July 1. Infestations were heaviest in the southern area. Infestations could become severe in Maine in 1971 unless controls are timely.

SOUTHWESTERN CORN BORER (Diatraea grandiosella) was severe at Avra Valley and Marana, Pima County, ARIZONA, in late-planted sorghum during September. Damage might have been less if seed had been planted earlier or treatments applied at a proper time. One Salt River Valley, Maricopa County, cornfield had 10 first and second instars per plant. Infestations were heaviest in Pima, Pinal, and Maricopa Counties. D. grandiosella lodged corn in southeastern NEW MEXICO. Counts were less abundant this season on sweet corn in Bernalillo and Valencia Counties and light in Sandoval County. D. grandiosella on corn in KANSAS infested an average of 30 percent of the stalks (girdled 12 percent) in the central district, infested 34 percent (girdled 11 percent) in the south-central district, and infested 23 percent in the southeast district. In MISSOURI it infested 36 percent of the plants (girdled 5.8 percent) in the southeast district and infested 5.6 percent (girdled 1.6 percent) in the southwest district. Southwestern corn borer damaged corn severely in Pulaski and Alexander Counties, ILLINOIS. Larvae overall, averaged 24 per 100 stalks, and in half of the fields surveyed, lodged 50-80 percent of the stalks. Significant economic damage was apparent only in Pulaski, Alexander, and Massac Counties. No specific treatment was applied. In ARKANSAS, this pest was economic on late-planted corn. Reduced corn acreage has minimized the importance of corn insects in the State. D. grandiosella was a serious pest of corn in northwestern and north-central ALABAMA with light infestations as far south as Washington County. Cherokee, Calhoun, and Cleburne were new county records making a total of 42 infested counties. SUGARCANE BORER (D. saccharalis) appeared to be the heaviest in the last 5 years in FLORIDA. Infestation rates on sugarcane were 9 percent in the eastern and slightly lower in the western part of sugarcane region of the Everglades. Damage was economic on about 50,000-55,000 acres of sugarcane. The braconids Apanteles spp. parasitized 10 percent and Agathis stigmatera 18 percent of the D. saccharalis larvae. Parasites not appearing until late August may account for the heavier

than usual damage by the sugarcane borer. LESSER CORNSTALK BORER (Elasmopalpus lignosellus) was heavy in eastern Palm Beach County, FLORIDA, during fall. Stand losses ranged 10-25 percent on corn in some farms. More scattered and lighter infestations occurred in the Everglades area. In SOUTH CAROLINA, E. lignosellus was more serious on sorghum planted after June. Damage was 60 percent in Newberry County by August 12. SOUTHERN CORNSTALK BORER (D. crambidoides) infested less than 2 percent of the corn throughout the Eastern Shore and southern MARYLAND. Heaviest damage (36 percent) was in a 40-acre stand in Talbot County.

FALL ARMYWORM (Spodoptera frugiperda) and Heliothis zea (corn earworm) infested an average of 15 percent of corn ears in Prowers, Bent, Otero, Crowley, and Pueblo Counties, COLORADO, but most damage was limited to ear tips. Fall armyworm was very light and was noted only in a few fields of late corn in KANSAS. Larvae were first found on late corn in Riley County early in September. In OKLAHOMA, larvae damaged grain sorghum from late June to early September. Counts were moderate in Coal County in mid-August, heavy in scattered fields in Jackson County in late August, and light elsewhere. Fall armyworm damaged many late-planted cornfields in ILLINOIS by feeding in the whorl. The most severe damage was in the southern sections where about 18,700 acres were treated. In INDIANA, larvae were reported from only a single field of corn, planted very late and in shooting tassel stage in the west-central district on August 7. Larvae were more common in 1969. Damage was heavy to whorls of late-planted corn in western TENNESSEE. In ALABAMA half-grown larvae were first found on corn in Greene County and on sweet corn in Lee County on June 18. Counts were heavy for the rest of the season on corn and grain sorghum throughout southern and central areas. Fall armyworm was present for most of the year in the Belle Glade area of Palm Beach County, FLORIDA. Larvae infested 75 percent of the sweet corn buds in unsprayed plots during May, and were very abundant again during fall. Counts at Sanford, Seminole County, were lighter than usual during May where damage appeared in early June on young sweet corn. Larvae were heavy and difficult to control on sorghum during spring and summer and damage was heavy at Hastings, Saint Johns County. Counts were also heavy at Quincy, Gadsden County, during midsummer. Fall armyworm damaged corn late in the season in SOUTH CAROLINA. Counts were heavy on sorghum from late July on, but not as serious as in 1966. In Frederick County, MARYLAND, first damage and 2-6 percent infested corn plants were noted August 3. Damage during August increased rapidly at Frederick and Thurmont, Frederick County. Mid-August infestations increased to 28-46 percent in many fields planted for silage. About 600 acres needed controls. Fall armyworm moths began appearing in traps July 18 in NEW YORK. Whorl damage and ear entries occurred in some untreated plantings. Ears in treated plantings were infested 1 percent at most.

BEE T ARMYWORM (Spodoptera exigua) was a problem on corn, sorghum, and sweet corn in ARIZONA. Peak larval activity was difficult to determine as populations on many crops and weeds statewide served as constant sources of reinfestation. S. exigua infested sweet corn and injured some field corn in the Everglades of FLORIDA. Larvae damaged sorghum at Belle Glade, Palm Beach County, during May and June. It was most abundant during June and early fall and more evident than for several years. Control was difficult. YELLOWSTRIPED ARMYWORM (S. ornithogalli) in SOUTH CAROLINA first damaged sorghum July 31. Counts were heavy in light traps, but damage was light.

BLACK CUTWORM (Agrotis ipsilon) lightly damaged seedling corn during mid-June in Brown County, KANSAS. Counts in NEBRASKA were similar to those of 1969, reaching economic levels in scattered areas of the east, southeast, and central districts. First trapped at Lincoln, Lancaster County, on April 19, moths peaked there May 1-8 and July 10-31. Damage peaked in June and subsided by June 19 in most areas. In IOWA black cutworm damaged 86,000 acres of corn in 1970 compared with 138,000 acres in 1969. Black cutworm and CLAYBACKED CUTWORM (A. gladiaria) damaged corn throughout MINNESOTA, but damage was not serious in any one area. Black cutworm infestations in corn were localized but severe in WISCONSIN, especially in Dane, Dodge, Fond du Lac, Dunn, Walworth, Racine, and Calumet Counties.



Midseason plantings were affected most. The acreage of such plantings was low in comparison with early and late plantings. Black cutworm was the insect of the year in ILLINOIS. More cutworm problems were reported in 1970 than in the past 3 years. A wet, early spring favored cutworm development. Control was poor in nearly all planting time treatments and in several broadcast applications. About 120,443 acres of corn were replanted and 139,519 acres received emergency control measures. Problems were most severe in southern and central areas but extended to northern sections as well. Most cornfields were not infested enough to warrant treatment, but some fields were replanted 3 times. Emergency control measures were precluded because of the random pattern of infestations over entire fields and the small plant size which cutworms cut above the growing point. Also in some cases, stands of 25,000 plants reduced to 22,000 plants in a random pattern was of minor importance. Black cutworm should be considered a potential problem in 1971. In DELAWARE, this pest continues to increase on several crops, especially on corn where heavy numbers occurred during late May and early June. In FLORIDA, black cutworm and GRANULATE CUTWORM (Feltia subterranea) injured corn in the Everglades area.

PALE WESTERN CUTWORM (Agrotis orthogonia) larvae in KANSAS did not damage seedling corn and sorghum in the west-central and southwestern areas during May and June as they have for the previous 4 years.

WESTERN BEAN CUTWORM (Loxagrotis albicosta) in northeastern COLORADO along with H. zea ranged 0-20 per 100 row feet. Adults emerged in mid-July. Larvae appeared by the end of July. Counts were heaviest in Kit Carson, Yuma, Washington, and Morgan Counties. Damage was moderate with losses light. Western bean cutworm was troublesome on corn in northwest and west-central KANSAS. About 2,000 acres of corn in Wallace County and 200 acres in Sherman County were treated. Trapped from early July to late August in 3 areas, moths peaked at 11 on July 29 at Tribune, Greeley County. Logan and Barton Counties are new county records. Numbers on field corn in NEBRASKA declined further in 1970. Moth catches at North Platte, Lincoln County, and Scottsbluff, Scotts Bluff County, were much lighter than in 1969. Flights peaked July 27 at North Platte and at Parks, Dundy County. The first egg masses were found on corn in York County on July 16. Larvae ranged 0-3 (average 0.8) per 10 ears in Hall County August 7, third to fifth instars infested 13 percent of the ears in Hamilton County August 14, and larvae ranged 1-3 per ear on 90 percent of the ears in a Perkins County field. Holt and Lancaster Counties were new county records for a total of 57 counties now known to be infested in Nebraska. In SOUTH DAKOTA, moths were taken in Lawrence, Pennington, Haakon, Jackson, and Bennett Counties for county records. No larvae have been found yet.

Other NOCTUID MOTHS were a problem in NEBRASKA. DARKSIDED CUTWORM (Euxoa messoria) damaged corn in Dodge, Washington, Platte, Polk, Colfax, Dawson, Clay, Saline, Seward, and York Counties. E. detersa damage to corn was generally less extensive than in 1969. DINGY CUTWORM (Feltia subgothica) increased dramatically in 1970, completely destroying some cornfields in the east and northeast districts of Nebraska. Numbers were heavy mostly in trashy fields. Damage to corn was most extensive in Saunders, Butler, and Dodge Counties where up to 2 larvae per row foot were found in occasional fields. Heavy flights peaked September 4 at Concord, Dixon County, and September 11 at Lincoln, Lancaster County.

STALK BORER (Papaipema nebris) in KANSAS only infested border rows of several fields of young corn in Neosho County during late June. Numbers in IOWA were light on corn. Throughout ILLINOIS it caused some problems in border rows of field corn.

SORGHUM WEBWORM (Celama sorghiella) was moderate in FLORIDA. Larvae averaged 2-8 per sorghum head during summer at Belle Glade, Palm Beach County. Counts of 4-5 per head caused little damage in western TENNESSEE. Counts in KANSAS were generally light on sorghum. About 4,700 acres were treated in the southeast

district, mostly in Crawford, Labette, and Neosho Counties. In ARKANSAS it is the number two pest of sorghum. Absent or at low levels until early September, larvae then increased to 10-15 per row foot in some areas. Treatment of a small percentage of the crop prevented loss.

Larvae of a CORN ROOTWORM (Diabrotica sp.) infested 50 acres of field corn in July at Montesano, Grays Harbor County, WASHINGTON. WESTERN CORN ROOTWORM (D. virgifera) was lighter than in the past years in COLORADO. Adults emerged in mid-July and counts averaged 0-6 per plant in most fields. Heavily infested fields were treated. Damage and loss were very light in the northeastern area. Larvae caused much damage to some fields in Otero County; damage was more widespread than in 1969. D. virgifera numbers in WYOMING remained similar in 1969 and 1970. The first adults appeared July 20 in Goshen County. Counts peaked the first week in August with averages of 1-9 per corn plant in Goshen and Platte Counties. About 1,300 acres were sprayed in these counties to control adults. D. virgifera damage was light to corn in MONTANA along the Yellowstone Valley from Billings, Yellowstone County, to Forsyth, Rosebud County.

Damage by western corn rootworm was evident for the first time in NORTH DAKOTA during 1970. Up to 60 percent lodging of corn and up to 25 adults per plant were observed in Richland County during July. The practice of continuous corn is increasing in the State. Steele County was a new county record. A new county record was also found in Barnes County for SOUTHERN CORN ROOTWORM (D. undecim-punctata howardi). D. virgifera was again the dominant species in SOUTH DAKOTA. Haakon County was a new county record for NORTHERN CORN ROOTWORM (D. longicornis). Diabrotica spp. increased about 250 percent in 1970 over that of 1969. This increase was first noted in early July when damage to untreated corn became extensive in Clay, Moody, and Brookings Counties. By mid-July excessive numbers damaged some treated fields in the eastern area. Damage was heavy for the first time in untreated fields in Marshall, Grant, Brown, and Spink Counties in the northeast area where rootworms had not been a particular problem in the past. Western corn rootworm adults built up to 15+ per plant in Clay and Fall River Counties by the end of July. Adult controls were applied in Fall River, Davison, and Union Counties but not in some southeastern areas because of too much drought and hail damage. About 1,000,000 acres were treated for rootworms. The average grain corn yield dropped from 57 bushels per acre in 1969 to 41 in 1970. Fields untreated in the past in northeastern South Dakota are expected to be treated in 1971. Counts are expected to be the same or heavier. Problems in 1971 are expected to increase in first-year corn where adults had moved into greener crops from drought-stricken corn before laying eggs; problems are expected to decrease in corn following corn where adults had moved out of corn cut early for silage because of drought. Corn rootworm numbers in NEBRASKA were lighter in 1970 than in 1969 when numbers were the lightest since 1958. Adults were also generally lighter. Occasional chemical failure and subsequent rootworm damage occurred, principally in the north and northeast districts. Larvae were first active at Mead, Saunders County, on June 10, a week earlier than in 1969. The first D. virgifera adults appeared at Mead on July 3. Counts peaked the first week in August but remained light, 1-6 per plant, in Lincoln, Lancaster, Seward, York, Butler, Hall, Burt, Thurston, Dakota, Dixon, and Wayne Counties. Silk clipping was light or negligible. Corn rootworm adults on silking corn in KANSAS were nearly always noneconomic, usually less than 2 per plant. Counts were heaviest in late July in a field in Geary County with 13 adults per plant and severely damaged silks, and on silking corn in early August with 9.3 per plant in Wallace County and 5.4 in Logan County. Only about 173,000 of 182,000 acres of corn treated for adults needed treatment. About 134,000 of these acres were in the 3 western districts. Larvae damaged about one-fifth of the field in Lyon County including many that were treated.

The first D. virgifera adults appeared in southwestern MISSOURI during the week ending July 4. Numbers were heaviest in this area. Larvae were light statewide. Lawrence and Dade Counties were new county records. Corn lodging in IOWA, mainly by D. virgifera, increased from 0.7 percent in 1969 to 7.6 percent in 1970. In MINNESOTA, D. longicornis and D. virgifera first hatched during the week of June



15, developed quickly with the hot weather, and first emerged as adults during the week of July 13, much earlier than in past years. Lodging appeared a week after strong winds moved through the State on July 15. Root damage was severe in many fields as far north as Swift County. An isolated case of damage in Clay County was the most northerly report of damage on record. Overall numbers increased 128 percent in 1970. The highest average number of beetles per acre was 57,873 in the southeast district. The percentage of western corn rootworm beetles increased in the southwest, south-central, southeast, and central districts. This species was predominant in the southwest, south-central, and west-central districts. Otter Tail County was a new county record. Corn rootworm counts and damage will increase in 1971. As usual the 3 southern districts will have the heaviest counts. Some counties in the 3 central districts will experience rootworm problems for the first time.

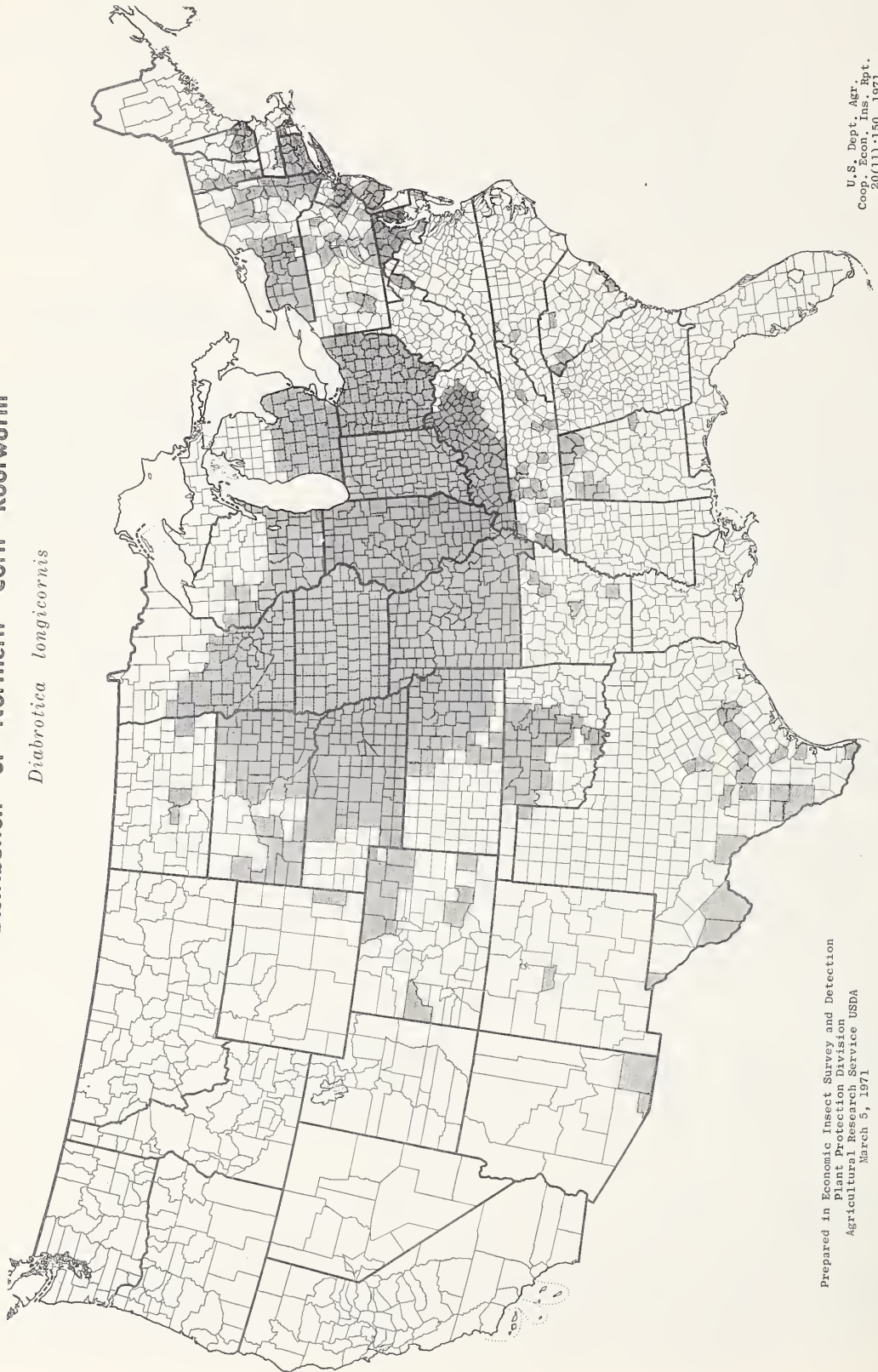
Corn rootworm adults appeared July 20 and peaked the second week of August in WISCONSIN. Scattered reports of heavy larval damage by D. virgifera and D. longicornis were received with some corn being stunted or killed. Overall numbers remained similar to those in 1969. D. virgifera was the predominant species in the southwestern and south-central areas. D. longicornis appeared to be steadily declining in MICHIGAN. Damage was found in only 2 of 69 cornfields. Young D. longicornis larvae appeared June 9 in northwestern OHIO. Adults were active by July 2. Damage to silks was heaviest from mid-July to mid-August. Two 80-acre fields in different areas were completely ruined. Soil in both fields had been treated during spring, indicating possible resistance. D. longicornis eggs in INDIANA first hatched in Tippecanoe County on June 12 and adults appeared on green corn silks in Orange County on July 7 and in all central districts by July 17. Infestations were fewer and generally lighter in 1970 than in 1969. Heavily infested corn was found in almost every county in the northern half of Indiana. Larval counts of 50 per root system were noted in a field in the north-east district. Damage by D. virgifera to corn was not evident in Indiana. New county records included La Porte, Porter, Lake, Kosciusko, Fulton, Jasper, Starke, and Marshall, with Kosciusko County being the easternmost record, extending infestations two-thirds across the State. D. virgifera and D. longicornis larvae were heavier than in 1969 and damage to root systems was pronounced in untreated demonstration plots in northern ILLINOIS this year. Warmer than usual soil temperatures in April and May hastened hatch by 10-15 days. New larvae appeared during late May and adults during late June and early July, earlier than usual. About 2,765,500 acres were treated with organic phosphates and carbamates, primarily continuous corn acreage, in the northern third of Illinois. Adults, averaging 2-3 per plant, and rootworm damage were the heaviest in Ogle, Stephenson, and Boone Counties. With averages of 4 or more per plant, 13 percent of the fields in the northern third of Illinois could be seriously infested in 1971. Rootworm damage is most likely to occur north of a line from Carthage, Hancock County, to Bloomington, McLean County, to Joliet, Will County, in 1971. Cook, Du Page, Will, Grundy, Livingston, Iroquois, McLean, and Ford Counties were new county records for D. virgifera. As this species moved eastward, the population pressure has increased around the periphery. The western species has slightly displaced the northern species over the last 5 years. D. longicornis was economic primarily north of U.S. Highway 36 from Pittsfield, Pike County, to Springfield, Sangamon County, to Decatur, Macon County. Rootworm damage occasionally occurred in the southern area in bottom land. Generally resistant to the chlorinated hydrocarbons, some northern corn rootworms in the east-central and southern areas were susceptible.

D. longicornis was reported for the first time from Winston, Marion, Lamar, and Fayette Counties, ALABAMA. Diseases, weather, and insects badly reduced corn yields. D. undecimpunctata howardi infestations in SOUTH CAROLINA were greater on corn in 1970 than in the last 4-5 years in Orangeburg, Williamsburg, Horry, and Bamberg Counties. D. longicornis adults were collected from corn silks in Caldwell and Alleghany Counties, NORTH CAROLINA, for a new State record.



# Distribution of Northern Corn Rootworm

*Diabrotica longicornis*



Prepared in Economic Insect Survey and Detection  
Plant Protection Division  
Agricultural Research Service USDA  
March 5, 1971

U.S. Dept. Agr.  
Coop. Econ. Ins. Rpt.  
20(11):150, 1971

D. longicornis adults in MARYLAND became active during the last week of July. Heaviest mid-August infestations were as high as 1 adult per ear in Carroll and Frederick Counties. Lodging during August ranged 3-14 percent in Washington, Frederick, Carroll, Baltimore, Howard, and Montgomery Counties. Adults but no lodging were present in Prince Georges, Anne Arundel, Talbot, Harford, Cecil, Kent, and Queen Annes Counties. Heaviest losses to production were found in Baltimore (3 percent) and Carroll (4 percent) Counties. Damage is expected to increase statewide within the next few years. Controls will be necessary if present population rates of increase are maintained. D. longicornis continued to increase in all of PENNSYLVANIA. Although larvae were as high as 20 per plant in mid-July, ample soil moisture may have permitted root systems to outgrow any extensive damage. Adults during late July and August were higher than in previous years, but most of the corn crop was pollinated before peak adult emergence. For the first time in Lycoming County, D. atripennis adults were noticed on corn silks in early August along with northern corn rootworm. D. longicornis larval damage in NEW JERSEY was light and scattered in Hunterdon, Warren, and Somerset Counties during June and July. About 2,000 acres of corn were treated at planting. By early August, adults were in Gloucester and Salem County fields but well below the economic threshold of 5 per ear. Adults averaged nearly 20 per ear in several western Hunterdon County fields August 13 and silk destruction was obvious. Yield losses of 10 percent were due to larval feeding. D. longicornis adults in NEW YORK were common but not abundant on sweet corn in the Hudson Valley and were abundant in the western area.

DESERT CORN FLEA BEETLE (Chaetocnema ectypa) damaged young corn and sorghum in the "Dixie area" of Washington County, UTAH. CORN FLEA BEETLE (C. pulicaria) damage was generally light on corn and confined to the southern half of ILLINOIS. C. pulicaria was light throughout VIRGINIA. C. pulicaria counts in MARYLAND remained the same as in 1969, but damage in many heavily infested fields ranged light to moderate. Most fields in Frederick, Montgomery, Howard, Baltimore, and Harford Counties were 40-100 percent infested. No economic damage was reported. Heavy early summer rains helped most corn grow out of early season damage. Damage in Talbot, Queen Annes, Caroline, Dorchester, Wicomico, and Somerset Counties was less conspicuous than in the central counties. In NEW YORK, C. pulicaria was extremely scarce in May following a severe winter. Corn was not treated for bacterial wilt protection, but wilt cases were rare. The new adults appeared in July and were moderately numerous in some untreated plantings in October. Wilt was not noticed on late corn.

A BILLBUG (Sphenophorus callosus) increased drastically in SOUTH CAROLINA, but MAIZE BILLBUG (S. maidis) remained unchanged. About 10,000 acres of corn were infested in Dillon, Florence, Marion, Sumter, Williamsburg, Orangeburg, Bamberg, and Dorchester Counties. The chlorinated hydrocarbon treatment was ineffective. Billbugs infested most of the counties in the Coastal Plains. S. maidis and S. callosus damage was heavy in scattered fields over the Coastal Plain of NORTH CAROLINA. Activity peaked during early summer. Chemical control was also ineffective.

RICE WATER WEEVIL (Lissorhoptrus oryzophilus) damage in CALIFORNIA was not as extensive as in 1969. Damage was more local than previously. A WEEVIL (Anacetrinus deplanatus) in TEXAS damaged grain sorghum in Collins, Ellis, Hill, Navarro, Brazos, Grimes, Bosque, and Milam Counties during July. Damage was scattered in several other northern counties. Infestations were widespread and light in Hale, Lynn, Crosby, Floyd, Briscoe, Lubbock, and Scurry Counties. One report from Swisher County indicated corn was infested.

SUGARBEET WIREWORM (Limonius californicus) reduced 10-90 percent of the corn stands near Tuttle, Gooding County, and Caldwell, Canyon County, IDAHO. Melanotus communis and SOUTHERN POTATO WIREWORM (Conoderus falli) caused heavy spotty damage to corn in the Everglades area of FLORIDA. Melanotus sp. was more severe on sweet corn at Zellwood, Orange County, during early spring than in recent years. M. communis continued a serious problem on sugarcane. Control was required at Belle Glade, Palm Beach County. Although wireworms remained a problem,



flooding for at least a month obtained 89-93 percent control throughout the sugarcane region of the Everglades. The first specimen of SAND WIREWORM (Horistonotus uhlerii) in 5 or 6 years in SOUTH CAROLINA came from Horry County on corn on May 20. M. communis was still the most important wireworm infesting corn in NORTH CAROLINA. Economic stand losses occurred statewide.

DUSKY SAP BEETLE (Carpophilus lugubris) was above normal in garden sweet corn in Salt Lake County, UTAH. It was common in some central area gardens, even when Heliethis zea (corn earworm) was very light or absent. Counts were heaviest in the southern area. Glischrochilus sp. adults in INDIANA were more abundant in corn this year than in 1969. Up to 25 per corn plant infested many fields in axils, damaged ears, or at damaged sites. C. lugubris damage in MARYLAND became economic on Eastern Shore sweet corn during late June and early July. Infested ears ranged 0-45 percent at that time, and ranged 10-55 percent after July and August in Talbot, Queen Annes, Caroline, Dorchester, and Wicomico Counties. Frequently a secondary invader in corn earworm infested corn, sap beetles were controlled where processors controlled the earworm.

SORGHUM MIDGE (Contarinia sorghicola) damaged grain sorghum in Tulare and Fresno Counties, CALIFORNIA. Damage was noneconomic in TEXAS. The heaviest numbers infested late-planted grain sorghum in Jackson County about July 10. Light infestations occurred in central, northern, Rolling Plains, and High Plains areas. Heavy numbers infested late-planted sorghum in southeastern OKLAHOMA during late September. A buildup in Payne County during early October occurred too late to cause damage. No damage in KANSAS was seen in headed sorghum. High counts occurred in southeastern MISSOURI during late August and September. Damage was severe to late sorghum. In ARKANSAS sorghum midge was the major pest of grain sorghum. Very light numbers infested most areas until mid-August. Located near earlier sorghum, late-sorghum blooming during mid-August or later had heavy infestations. Isolated fields were not infested regardless of planting date. Damage was prevented by treating some late sorghum, but lack of grower familiarity with the pest resulted in yield reduction in some late acreage. In TENNESSEE it damaged some grain sorghum planted after June 1. In FLORIDA, larvae damaged 70-90 percent of the kernels in sorghum variety plots at Marianna, Jackson County, during September.

CHINCH BUG (Blissus leucopterus leucopterus) was noneconomic to light in KANSAS during February and early March. Heaviest infestations were found in the central and south-central districts where numbers generally were slightly higher in 1970 than in 1969. The only damage was localized in young sorghum in Sumner County; control was applied in some cases. In OKLAHOMA it infested corn and sorghum in scattered areas from mid-May to mid-September. Counts were heavy only in a small, experimental planting in Grady County during early August. In Jackson County, TEXAS, damage was reported on April 17 with light to heavy numbers and some control applied. Damage occurred in Live Oak, Gonzales, and Lee Counties during May. Activity increased in Throckmorton and Archer Counties and in several Blackland counties June 5 to July 10.

POTATO APHID (Macrosiphum euphorbiae) on corn in all areas of the Arkansas Valley, COLORADO, was not economically important. Light numbers of M. euphorbiae infested young corn in Tulsa, Hughes, and Johnston Counties, OKLAHOMA, during the second half of May. The first YELLOW SUGARCANE APHID (Sipha flava) in Oklahoma was found on young corn in Tulsa and Johnston Counties the second week of May. Numbers on sorghum were light in Payne, Ottawa, and Nowata Counties during June and July and heavy, 500-1,000 per plant, in scattered Ottawa County fields during early August. S. flava caused no unusual problems in FLORIDA, but 2,000 acres of sugarcane were treated.

BANKS GRASS MITE (Oligonychus pratensis) in Churchill County, NEVADA, infested silage corn at about the same level as in 1969. Buildups in July and early August required treatments. Many fields were treated earlier than usual by ground equipment. Fields treated later had heavier numbers and damage, and were treated by aircraft. O. pratensis appeared on corn in Goshen, Platte, and Laramie



Counties, WYOMING, the first week of August. Most infestations caused little damage. A few fields were treated in Platte County. O. pratensis caused much damage in Crowley, Otero, and Pueblo Counties, COLORADO. Mites appeared in mid-June and continued to increase until mid-August. Chemical controls were not effective. TWOSPOTTED SPIDER MITE (Tetranychus urticae) and O. pratensis caused much damage in northeastern Colorado. Heavy numbers occurred in mid-August and extensive controls were used in some areas. Heavy damage occurred in scattered fields, with overall loss light. O. pratensis was light on Johnson grass in Hudspeth County, TEXAS, on June 19. Counts were heavy on silage corn in Culberson County and on grain sorghum in El Paso, Hudspeth, Culberson, Reeves, and Pecos Counties during late July and early August. Counts ranged light to heavy on corn in Bailey, Lamb, and Castro Counties during August. A late buildup of Tetranychus spp. and O. pratensis in the central, south, and panhandle districts of NEBRASKA did not cause serious damage because most corn was dented and past the critical stage. In a few cases, controls were applied in the southwest and panhandle counties. Unspecified SPIDER MITES damaged corn in KANSAS, particularly in western districts, but primarily in the southwest district. Heavy infestations were found mostly on maturing corn in at least the soft-dough stage. Specimens collected from corn during late August in Sherman, Stafford, and Jefferson Counties were determined as T. urticae. Most of the 68,400 acres of corn treated were confined to the western districts and 56,000 of these acres were treated in the southwest district.

#### SMALL GRAINS

##### Highlights:

FALL ARMYWORM was damaging to small grains in several Southern States. PALE WESTERN CUTWORM may be troublesome in southwestern South Dakota in 1971. WHEAT STEM SAWFLY stem cutting of wheat decreased in North Dakota. BARLEY THRIPS damaged barley in North Dakota.

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FALL ARMYWORM (Spodoptera frugiperda) was heavy and damaged millet at Quincy, Gadsden County, FLORIDA, during July. Damaging populations were observed in ALABAMA on several hundred acres of small grain in Etowah and Lawrence Counties during mid-October. In SOUTH CAROLINA, this pest was found on seedling rye in Aiken and Jasper Counties. Fall armyworm caused damage to newly sprouted small grains throughout TENNESSEE in September. These infestations were of short duration and controls were effective where applied. Larvae of this species caused severe injury to seedling grain throughout VIRGINIA during the first two weeks of October. Several fields were replanted. Counts in OKLAHOMA were heavy on scattered small grains in Carter and Stephens Counties in early October, and scattered and light in Ellis, Payne, Jackson, and Tillman Counties.

PALE WESTERN CUTWORM (Agrotis orthogonia) was light again this year in UTAH, and no serious injury was reported. Populations in WYOMING were light. Larvae ranged 0-8 per linear foot in Goshen, Platte, and Laramie Counties. Little damage was observed. The first larvae were collected in Goshen County April 6. About 100 acres of wheat were treated in Laramie County. Larval damage was observed on winter wheat in Tripp, Lyman, Bennett, and Fall River Counties, SOUTH DAKOTA, in May. Several thousand acres were treated. Some fields in Bennett County were damaged by a combination of winter injury, soil blowing, and cutworms, and were replanted. Infestations of similar intensity may occur in southwestern areas in 1971. The expected severe pale western cutworm infestation in NEBRASKA did not materialize. Heavy snowfall in March and April and timely rains for the rest of the growing season favored disease among the larvae and encouraged vigorous growth of wheat. With adequate moisture, most wheat was able to withstand 1-2 larvae per row foot. Larvae were first active in Perkins County on March 4, but early feeding was slowed by cool weather. Cases of significant damage to wheat in the southwest district were few, and probably fewer than 10,000 acres were sprayed. Activity in the Panhandle was somewhat slower and was generally light, with numbers in most fields averaging well below 1 per foot. In some panhandle

areas, the confusion of cutworm damage with crown rot of wheat and damage by Hylemya cerealis (an anthomyiid fly) led to the unnecessary use of chemical control. Some larval activity continued into late May, and damage was noted in scattered fields in northern Dawes County. Pale western cutworm in KANSAS was not reported as damaging this spring in wheat. Moth counts in blacklight traps in central and western Kansas were very low again this year. In OKLAHOMA, larvae destroyed stands of corn in fields planted in wheat stubble in Texas County. Last instars were present the first week of June.

BROWN WHEAT MITE (Petrobia latens) developed heavy populations on 4,000+ acres of winter wheat and barley in Pershing County, NEVADA, in late April. About 1,500 acres were chemically treated and irrigation was used as a control measure on the remaining acreage. Populations and damage were again heavy in this area in June and insecticides were applied. Damage to small grain in UTAH was below normal, probably because of spring and some summer rains. Brown wheat mite remained light and noneconomic in all areas of WYOMING. This pest was reported in Weston, Crook, and Johnson Counties for new records. Brown wheat mite populations in KANSAS were light in early March and mid-April in McPherson, Saline, Ottawa, Cloud, Republic, Washington, Clay, Edwards, Kiowa, Comanche, Barber, Clark, and Meade Counties. In OKLAHOMA this pest infested wheat in Cimarron County from late March to mid-May. Counts seldom ranged more than 50 per linear foot. Heavy numbers infested scattered wheatfields in several southwestern counties from late April to mid-May.

WINTER GRAIN MITE (Penthaleus major) was first reported in damaging populations on small grain in TEXAS from Jones and Foard Counties on February 9. Populations were medium in Blanco and Bell Counties on small grains during mid-February. Statewide populations were generally light. Counts on small grains in OKLAHOMA were moderate to heavy in Cotton, Tillman, and Grady Counties during January, and in scattered fields in Noble and Kay Counties in mid-April. Infestations were generally light elsewhere. Counts ranged up to 250 per linear foot in Kiowa and Jackson Counties by early December. Winter grain mite was generally not a problem in KANSAS wheat. Moderate to heavy infestations were reported in Labette and Wilson Counties in mid-April and light in other counties.

ENGLISH GRAIN APHID (Macrosiphum avenae) was noneconomic on small grains in INDIANA. This aphid appeared throughout MICHIGAN on the leaves of small grain about mid-June, but no controls were needed. English grain aphid began to appear on small grain in WISCONSIN about April 24. Populations were as high as 60 per sweep before declining. The average population was near 3 per sweep in Wisconsin. The combination of parasitism, predation, and "wash off" were attributed to maintaining light counts. Populations increased in August on late-planted oats, wheat, and barley in northwest MINNESOTA. At that time a combination of English grain aphid, Schizaphis graminum (greenbug), and Rhopalosiphum maidis (corn leaf aphid) troubled growers in the Red River Valley, but numbers did not usually warrant control. Lady beetles, lacewings, and nabids helped to check the aphid population. Heavy populations of English grain aphid in NORTH DAKOTA infested late-planted wheat and barley during mid-August in Walsh, Pembina, Grand Forks, and Traill Counties. Counts of 300 per wheat head and 100 per barley plant caused damage in many fields. About 14,000 acres were treated in Walsh and Pembina Counties. This pest was not reported on wheat during the spring and fall in KANSAS, and counts in OKLAHOMA were very light during the spring.

Other APHIDS infested small grains in several areas. APPLE GRAIN APHID (Rhopalosiphum fitchii) was found in wheat surveyed in many KANSAS counties in all districts during November. No damage was reported in wheat during the spring. This pest was generally very light in UTAH. R. padi was generally light on small grains in Oklahoma from early March to mid-April. Highest counts were 100 per linear foot in a few fields in McCurtain, Le Flore, and Bryan Counties.



HESSIAN FLY (Mayetiola destructor) populations were light again this year in ILLINOIS. The State average was 3 "flaxseeds" per 100 tillers. Heaviest counts were in Randolph, Jackson, and Jefferson Counties. No economic damage is expected for 1971. The percent of infested fields in INDIANA dropped from 49 percent in 1969 to 22 percent this year. The percent of fields having 10 percent or higher infestation increased from 3 to 9 percent, and the number of puparia per infested stem increased from 3.6 to 4.8. Hessian fly infestations were lighter in KANSAS wheat than in 1969. Loss was estimated at about 784,000 bushels as compared to 2,000,000 bushels in 1969. Greatest loss for any one district in 1970 was about 521,000 bushels in the central district, and the lowest was in wheat in the southeast district, where loss was zero bushels. In mid-November up to 90 percent infested plants were found in wheat planted just prior to the fly-free date in Pawnee County. Often 60 to 70 percent infestation was found when such fields were located near old fields with volunteer wheat. No infestations were found in fields planted after the fly-free date. This pest was noted in 11 counties in MONTANA in 1969 and only 9 counties in 1970. However, damage was only observed in Chouteau County.

AN ANTHOMYIID FLY (Hylemya cerealis) caused unprecedented damage to scattered fields of wheat in Cheyenne, Kimball, and Morrill Counties, NEBRASKA. Stand losses in 2 of 5 fields reached 15 percent but were negligible in other fields.

WHEAT STEM MAGGOT (Meromyza americana) populations in MICHIGAN were above normal but not economic. Infestations in NORTH DAKOTA were more severe this season with 3-8 percent blasted heads on wheat in Cass, Dickey, and Richland Counties. Infestations seldom exceeded 1 percent.

WHEAT STEM SAWFLY (Cephus cinctus) stem cutting in wheat decreased from 0.8 percent in 1969 to 0.7 percent in 1970 in NORTH DAKOTA. The highest percentage of cutting was found in several counties east of the main wheat stem sawfly area. Resistant wheat varieties in use have caused a decrease in infestations since 1967. The 1970 decline is attributed to the late seeding of wheat in most counties.

A DARKLING BEETLE (Blapstinus oregonensis) severely damaged borders of several wheat plantings in WASHINGTON at Odessa, Adams County, and in the Horse Heaven Hills of Benton County. This is the first report of damage by this species to wheat in the central and eastern areas of the State.

SUGARBEET WIREWORM (Limonium californicus) reduced 30 percent of the barley stand near Gooding, Gooding County, IDAHO. Populations of WESTERN FIELD WIREWORM (L. infuscatus) ranged 2-12 per square foot in wheat and barley. Seed treatment was needed for spring-planted small grains in many northern areas.

CHINCH BUG (Blissus leucopterus leucopterus) destroyed a few young fields of wheat and barley in Cotton, Kiowa, and Comanche Counties, OKLAHOMA, during October and early November.

Two species of THRIPS, Rhipidothrips brunneus and Chirothrips mexicanus, were reported damaging barley at a few locations in CALIFORNIA. In NORTH DAKOTA, BARLEY THRIPS (Limothrips denticornis) had entered leaf sheaths of rye by the first week of June. Barley, the preferred host, was still in the early stooling stage and escaped the main migration. Adults and nymphs were economic on early seeded barley in southeastern counties the first week in July. Damage and counts of 40 adults per plant occurred on late-seeded barley in northeastern NORTH DAKOTA by mid-August.



TURF, PASTURES, RANGELAND

Highlights:

The FALL ARMYWORM outbreak in South Carolina was the most serious in 15 years in the State. Fall armyworm was heavy on grasses and pastures in Alabama, and was heavy on these hosts in North Carolina. SOD WEBWORMS were troublesome in Idaho, Utah, Kansas, and Nebraska. CHINCH BUGS damaged grasses in some areas.

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The FALL ARMYWORM (Spodoptera frugiperda) outbreak in SOUTH CAROLINA was one of the most severe to occur in the State, especially from Ridgeland, Jasper County, and Columbia, Richland County, to the mountains. This pest attacked various lawn grasses and fescue, rye, Bermuda grass, sorghum, and corn. The first report of the season was on grass at a golf course July 22. By August 5, outbreaks were widespread from Chesterfield County and Richland County to Greenville County and elsewhere. There was a decline about August 18, but by August 26 infestations appeared in Barnwell, Richland, and Greenville Counties. Populations were increasing statewide by September 9. This occurrence was the most widespread and serious infestation of past 15 years. Fall armyworm infestations were statewide by September 16. By September 25 there was another lull. Larvae damaged winter rye by October 19 in Jasper County. This outbreak compares with those of the late 1940's and 1950's and 1960, 1964, and 1966. Because of the rapidly changing status of plants and trends toward pasture and forage plants, outbreaks of fall armyworm will become more important in South Carolina in the future. Populations in ALABAMA were heavy after mid-June on Sudan grass, Coastal Bermuda grass, and turf grasses throughout the southern and central areas. Larvae of this species and Pseudaletia unipuncta (armyworm) were first reported in corn in Greene and Lee Counties on June 18. Numbers steadily increased in the south and central areas with the most northern infestations reported as heavy in Jefferson County. Of the 142,440 acres of grass and pasture crops infested, 39,200 acres received 1.4 applications of insecticides at a cost of \$96,000. Fall armyworm in TENNESSEE, caused light to moderate damage to newly seeded pastures in September. Fall armyworm damage in NORTH CAROLINA ranged medium to heavy on field crops, lawns, and golf courses, with most damage from August through October. Damage continued in the Coastal Plain until mid-November. The heaviest infestations were from Lincoln County to Pender County and north to Northampton County.

Several species of SOD WEBWORMS (Crambus spp.) were of concern on lawn grasses in many areas. C. bonifatellus remains a lawn pest in many areas of CALIFORNIA; however, the general occurrence has been reduced by treatments. In IDAHO, CRANBERRY GIRDLER (Chrysoteuchia topiaria) infested about 20,000 acres of bluegrasses in Kootenai County. The seed crop is dependent on sod webworm control. Much of the acreage was treated throughout the season, but surveys into September did not indicate numbers which would justify treatment. Another species of Crambus with counts of 4 per sweep, was collected for the first time in a grass drainage area in the Lewis County seed area June 16. Sod webworm injury to lawns occurred in scattered localities of UTAH. Damage was less severe in Cache County in 1970 than in 1969 in spite of very heavy adult activity. Sod webworms were a major problem in Midway Bermuda grass, bluegrass, and zoysia grass in lawns and nurseries in KANSAS. Problems developed much earlier than in 1969. First damage report was at Manhattan, Riley County, in early July. Some lawns at Manhattan had large dead areas in late August. Counts of up to 6 late instars per square yard were found along with pupae and adults. Larvae up to 8 per square foot were found in a planting of Midway Bermuda grass in Harvey County in early September. Many controls were applied. Sod webworm problems generally increased on lawns in the northeast, east, southeast, central, south, and southwest districts of NEBRASKA. Large flights of Crambus spp. were observed at Lincoln, Lancaster County, and Concord, Dixon County. Damage peaked in late August and early September when most lawns were under moisture stress. Severe larval clipping of lawns in Lancaster and Douglas Counties resulted in extensive losses. Where lawns were heavily watered and well cared for, damage was minimal. Larval counts of up to 2 per square foot in May did not result in generally extensive lawn kills, but

15-75 percent of several lawns were killed by September 4 in Lancaster County. However, 50-80 percent of the larvae had pupated and adult emergence was underway at this time. The first adult of BLUEGRASS WEBWORM (C. teterrellus) in INDIANA was recovered in blacklight trap May 19 in Tippecanoe County. This species was more abundant this year than for the past 2 years. Damage by sod webworms in MARYLAND was moderate to heavy in several areas of Prince Georges and Montgomery Counties. Several hundred lawns in these counties were damaged. Bluegrass varieties were the most seriously infested lawn grasses.

WESTERN TENT CATERPILLAR (Malacosoma californicum fragile) larvae defoliated bitterbrush in the Chemult area of Klamath County, OREGON, in June. A 65-acre planting of Purshia tridentata was also severely damaged in the Wamic White River area of Wasco County. Larval damage in UTAH was below normal in most range and forest areas. However, there was some scattered damage to bitterbrush in Sevier County, and to other plants. This pest was generally below normal in Washington, Grand, and San Juan Counties.

Two species of PYRALID MOTHS caused problems in the Everglades area of FLORIDA. Marasmia trapezalis larvae were abundant in ungrazed or lightly grazed grasslands; 50 to 90 percent of the leaf terminals were rolled and had portions stripped of a layer of cells. Larvae of LESSER CORNSTALK BORER (Elasmopalpus lignosellus) nearly destroyed 1,700 acres of young Bahia grass pasture on one ranch and severely damaged 2,700 acres of Bahia grass and Pangola grass on another ranch. This has been a serious pest of vegetable and field crops in the Everglades for many years, but the severity of damage to pastures is a new development in this area.

Larvae of EUROPEAN CLOVER LEAFTIER (Mirificarma formosella) caused some damage to pastures and native clovers in the infested counties in northern CALIFORNIA. Although larvae of the SAGEBRUSH DEFOLIATOR (Aroga websteri) were below normal in abundance, light to moderate damage was noted on rangeland in UTAH.

WESTERN TUSSOCK MOTH (Hemerocampa vetusta) infestations were generally light in Douglas and Ormsby Counties, NEVADA, but developed heavy populations which entirely defoliated bitterbrush (Purshia tridentata) in areas of southern Washoe County. WESTERN YELLOWSTRIPED ARMYWORM (Spodoptera praefica) larvae in IDAHO damaged pastures at Pasadena, Elmore County, in late September and early October. Larvae of a PSYCHID MOTH (Apterona crenulella) were below normal, but caused light to moderate damage to rangeland in UTAH. Larvae of GRASSWORMS (Mocis spp.), mostly M. latipes, caused moderate to heavy but spotty damage to pasture grasses in Everglades area of FLORIDA, although damage was generally light when compared to previous seasons.

Several SCARABS were of concern in sodded areas. In SOUTH CAROLINA, unusually heavy adult flights of GREEN JUNE BEETLE (Cotinis nitida) were observed in the Piedmont area. Heaviest flight observed was in the vicinity of Pendleton, Anderson County, July 23. This was apparently a delayed emergence as rain had just preceded it. Adult emergence was heavy in many areas of TENNESSEE during July. Heavier populations of larvae were observed in pastures and lawns during October. Generally, damage was light, however, larvae were annoying to many homeowners by making small mounds in lawns. ASIATIC GARDEN BEETLE (Maladera castanea) larvae averaged 1 per square foot of turf at Hyattsville, Prince Georges County, MARYLAND. Larvae of ORIENTAL BEETLE (Anomala orientalis) continue to increase in home lawns in NEW JERSEY. Larvae were heavy in Bergen, Essex, Somerset, and Mercer Counties. Unspecified WHITE GRUBS caused near normal damage to lawns throughout UTAH.

BLUEGRASS BILLBUG (Sphenophorus parvulus) has spread throughout Salt Lake County, UTAH, except for the Magna area, and lawn damage was conspicuous. Unspecified Sphenophorus spp. in KANSAS, damaged Midway Bermuda grass and zoysia plantings in nurseries from late July to late September. Up to 10 per square foot were found in one planting of zoysia in Saline County in early August. Sphenophorus venatus was reported October 21 from Florence, Florence County, and Clemson, Oconee County, SOUTH CAROLINA. Adults have been reported throughout the State.



VEGETABLE WEEVIL (Listroderes costirostris obliquus) larval damage was heavy to dichondra lawns in scattered CALIFORNIA locations. Damage was more noticeable than in recent years. Adults of the STRAWBERRY ROOT WEEVIL (Brachyrhinus ovatus) and B. rugosostriatus were unusually numerous in canyon areas of northern and central UTAH.

SWEETPOTATO FLEA BEETLE (Chaetocnema confinis) was a major pest of dichondra lawns in the Salt River Valley and Tucson areas of Maricopa and Pima Counties, ARIZONA. This pest damages lawns which are under stress and is most active from mid-May through September. This problem has developed in recent years.

HAIRY CHINCH BUG (Blissus leucopterus hirtus) severely injured lawns in several areas in southern NEW HAMPSHIRE, and caused browning and loss of sod. During the period from mid-August to mid-October lawn damage was much heavier than usual in PENNSYLVANIA. This pest was most abundant in eastern and south-central sections and damage was reported from all areas of State. CHINCH BUG (Blissus leucopterus leucopterus) in MARYLAND, required controls in Prince Georges, Montgomery, and Baltimore Counties. Lawns were damaged in the Kanawha Valley and other WEST VIRGINIA areas. Most damage appeared in late August and September, but adults and nymphs were present in late July. Moderate numbers damaged St. Augustine grass lawns in Bryan County, OKLAHOMA, in mid-August. SOUTHERN CHINCH BUG (Blissus insularis) continued to be a severe pest of untreated St. Augustine grass lawns throughout FLORIDA. Populations in Everglades area pastures were lighter than in 1969 although 1970 was dryer and more favorable for the insect. Some St. Augustine grass pastures had small areas showing damage. CHINCH BUGS (Blissus spp.) were again prevalent in coastal areas of OREGON in the fall. Chinch bugs caused browning of entire lawns at Newport, Lincoln County, and considerable damage to a lawn at Salem, Marion County.

TWOLINED SPITTLEBUG (Prosapia bicincta) was heavy in light traps and continued comparatively heavy into fall in the Everglades area of FLORIDA. Some pastures showed typical bronzing discoloration in St. Augustine grass during late summer. This grass recovers fairly well from twolined spittlebug infestations. This species was mainly a pest of Coastal Bermuda grass in central and southern ALABAMA and of lawn grasses in isolated southeastern and southwestern areas of the State. Twolined spittlebug was observed about mid-May in Charleston County, SOUTH CAROLINA. The statewide infestation was less than usual, probably due to dry weather.

BANKS GRASS MITE (Oligonychus pratensis) caused heavy damage to crested wheatgrass in Esmeralda County, NEVADA, in early June. Numbers were reduced to subeconomic levels by rain and snow. Heavy numbers on timothy hay in Lyon County in June required chemical controls. Small, localized infestations on various grasses in other areas were of no concern except in experimental seed plots of Kentucky bluegrass in Washoe County and on crested wheatgrass in Lander County.

Populations of a GRASSHOPPER (Schistocerca obscura) in FLORIDA, were somewhat less numerous and economic damage was lighter than 1969. A surprising development was that some of the most economic wireworm species were effective egg predators of this grasshopper. The most important grasshoppers in ALABAMA were REDLEGGED GRASSHOPPER (Melanoplus femurrubrum), DIFFERENTIAL GRASSHOPPER (M. differentialis), and AMERICAN GRASSHOPPER (Schistocerca americana). These species were found statewide with M. femurrubrum dominant. Most serious damage occurred on 2- to 6-leaf clover seedlings during the fall.





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