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Crop Insects of Northeast Africa-Southwest Asia

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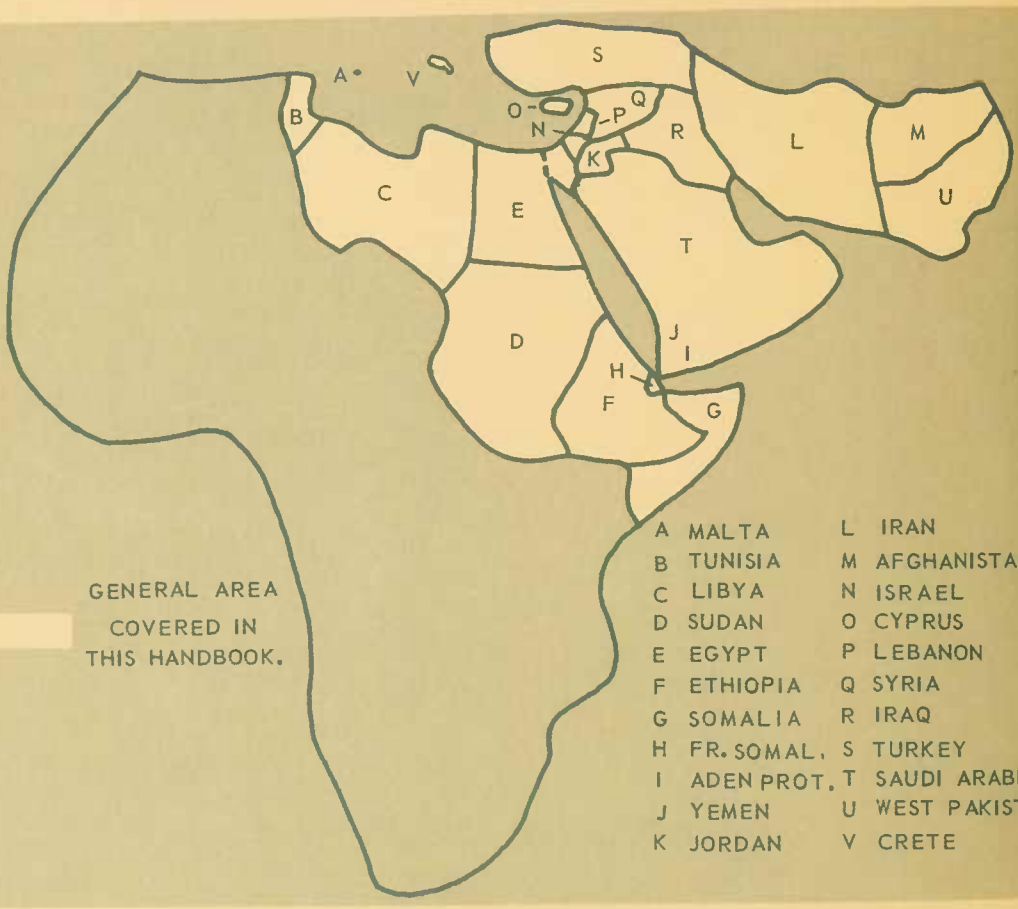
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THIS HANDBOOK.
A MALTA
B TUNISIA
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H FR. SOMAL.
I ADEN PROT.
J YEMEN
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O CYPRUS
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Q SYRIA
R IRAQ
S TURKEY
T SAUDI ARABIA
U WEST PAKISTAN
V CRETE

Crop Insects of Northeast Africa-Southwest Asia

By Joseph W. Gentry

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UNITED STATES DEPARTMENT OF AGRICULTURE

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CROP INSECTS OF NORTHEAST AFRICA-SOUTHWEST ASIA

By JOSEPH W. GENTRY,[1] *Plant Pest Control Division, Agricultural Research Service*

This handbook is intended to serve as a reference for economic entomologists, particularly those in plant-protection activities. It has been compiled from personal observations and reports of Regional Insect Control Project personnel and their counterparts in several countries within the northeast Africa-southwest Asia area and from economic literature. The Regional Insect Control Project, under sponsorship of the U.S. Department of State agencies for foreign technical assistance, has aided countries in this general area in plant-protection operations since the early 1950's.

Increased attention is being devoted to the crop-pest problem in the developing countries of northeast Africa-southwest Asia, as pest control is an integral part of their economic effort in agriculture. Although broad programs of applied entomology, including survey, plant quarantine, control, research, and extension, have been initiated or revitalized in many places, the pest situation will be complicated for some time by changing agricultural patterns. Introduction of new crops and crop varieties together with expanding crop practices, including reclamation, extensive irrigation, and intensive culture, will undoubtedly lead to new insect problems involving native species or introduced species that have become established in these countries. In addition, the great increase in international traffic will multiply the hazard of pest introduction into the various areas. Some interesting examples of new pest conditions in these countries have appeared in recent literature.

The risk of error inherent in an attempt to list crop insects of the vast northeast Africa-southwest Asia area has been understood from the outset of this work. The need for a readily available reference source on general economic insects in the area outweighs such consideration. Great care has been exercised, nevertheless, to eliminate all erroneous or questionable material.

Inasmuch as the subject has been approached from the economic standpoint, the pests have been grouped primarily under crop categories. Further grouping by order, family, and genus and species is intended to make the compilation more meaningful and facilitate its use. In this system of presentation, it is not practical to place general-feeding species under any one crop; therefore, they have been placed under the heading "Polyphagous Insects" and cross-referenced under the different crops on which they feed.

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[1] Assistant coordinator and survey specialist (1960–62), Regional Insect Control Project, Plant Pest Control Division, at Beirut, Lebanon. This project, including publication of this handbook, is funded by the Agency for International Development, U.S. Department of State.

To attempt to list all insects collected or reported from crop plants in northeast Africa-southwest Asia is beyond the scope of this work. Likewise, it is not possible to list complete host range and distribution. Generally, distribution has been limited to the area under consideration, but in some cases occurrence in nearby areas is also shown. It should be emphasized that within the area, host data and distribution as well as information on biology, habits, and economic importance are often incomplete or unavailable, primarily because of the lack of knowledge on the general economic insect situation.

Pest species determined by cooperating taxonomic specialists of the U.S. Department of Agriculture and the U.S. National Museum are indicated in the text by an asterisk (*) after the name of the country in which they were collected. A few special identifications were made by the Commonwealth Institute of Entomology (London) and the Muséum National d'Histoire Naturelle (Paris) and are indicated by a dagger (†) and double dagger (‡), respectively, after the name of the country.

The major literature sources used for this compilation were the Review of Applied Entomology (vols. 1–50, 1902–62), the Société Entomologique d'Egypte Bulletin (vols. 1–21, 1908–37), and the Société Fouad Premier d'Entomologie Bulletin (vols. 22–44, 1938–60). Other sources consulted are included under Selected References at the end of this handbook. Unpublished data, although reviewed, have not been included in the references.

The Index to Species at the end of this publication will be helpful in regard to nomenclature. Preferences of American specialists often differ from those of Old World taxonomists.

POLYPHAGOUS INSECTS

Acarina

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus californicus (Banks). Citrus, guava, plum, grape, other plants. Egypt, Cyprus, Libya, Israel, Italy. Some importance on citrus in Egypt.

Brevipalpus obovatus Donn. (=*inornatus* (Banks)), privet mite. Citrus, grape, cotton, tea, pear, ornamentals. Libya,* Cyprus, Egypt,* Aden, Iran,* Ceylon. Damage to tea reported from Iran; apparently some importance on cotton in some areas; heavy infestations reported from Libya on citrus.

Brevipalpus phoenicis (G.). Citrus, grape, deciduous fruit, ornamentals, palms, tea, coffee, other plants. Tunisia,* Egypt, Aden, widely distributed.

Tetranychidae (spider mites)

Tetranychus atlanticus McG., strawberry spider mite. Cotton, watermelon, beans, apple, sweetclover, castorbean, many plants. Iran,* Iraq,* Libya,* Egypt, Turkey. Major pest on cotton in Iraq; heavy infestation on watermelon in Libya; severe on apple in Turkey.

Tetranychus cinnabarinus (Bdv.). Cotton, citrus, beans, rose, polyphagous. Tunisia,* Libya,* Lebanon,* Egypt,* Ethiopia,* Israel. One of most important mites on cotton in Egypt; caused 10-percent reduction of this crop in Israel.

Tetranychus telarius (L.), two-spotted spider mite. Cotton, rose, apple, citrus, beans, watermelon, polyphagous. Egypt, Libya,* Lebanon, Sudan, Somalia, Turkey, Israel, Syria, Pakistan, Iran, Jordan, Cyprus, many other areas of world. Minor pest on cotton in Pakistan; important in Iran and Jordan; serious on beans and watermelon in Cyprus; important on fruit in Libya; most prevalent spider mite in Egypt.

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

Acrotylus insubricus (Scop.). Tomato, cotton, rice. Libya,* Egypt, Pakistan, Iran, Cyprus, U.S.S.R. (Transcaucasia).

Aiolopus savignyi (Kr.) (=*A. affinis* Bol.), Sudan plague locust. Sorghum, millet, clover, other crops. Sudan, Cyprus, Iran, Egypt, Pakistan, Yemen. May cause severe loss of seedlings in Sudan; minor pest in Iran and Pakistan.

Aiolopus strepens (Latr.). Alfalfa, clover, grasses, cotton, other plants. Libya,* Egypt, Iran, Cyprus, Jordan, Israel, Pakistan.* (Specimens collected in West Pakistan determined as *Aiolopus* sp., probably *strepens* (Latr.).) One of most important grasshoppers in Egypt; minor pest in Iran and Pakistan.

Anacridium aegyptium (L.), Egyptian tree grasshopper. Alfalfa, tobacco, citrus, apple, cotton. Libya,* Turkey, Lebanon, Israel, Cyprus, Egypt, Jordan, Iran, Iraq, Afghanistan,* parts of U.S.S.R., Greece. Usually minor pest in Egypt; occasionally damages cotton in parts of Africa.

Anacridium moestum melanorhodon (Wlk.), tree locust. Desert trees and shrubs, grains, fruit trees, cotton, other plants. Sudan,* Chad, Nigeria. Defoliates trees and moves into cropland; some infestations warrant control measures.

Arcyptera labiata (Brullé). Cereals, forage. Turkey, Greece. Controls warranted in Turkey in 1959.

Calliptamus barbarus Costa (=*C. siculus* Burm.). Wheat, corn, millet, alfalfa, tobacco, desert plants. Afghanistan,* West Pakistan, Libya. Serious damage some years in West Pakistan, major pest of

corn and millet; required controls in crops at Mimlah, Afghanistan, in 1961.

Calliptamus italicus (L.), Italian locust. Cereals, forage, cotton, vegetables, desert and other plants. Afghanistan, Turkey, Iran, Pakistan, Iraq, Israel, Syria, Libya, Cyprus, U.S.S.R., Italy, Greece. Serious polyphagous pest often requiring large-scale controls, especially in Turkey, Iran, Afghanistan, Pakistan.

Calliptamus palaestinensis Ramme. Tobacco, corn, beets, other crops, wild plants. Jordan, Israel.

Calliptamus turanicus Tarb. Cotton, cereals, other crops. Iran, U.S.S.R. Economic species.

Catantops haemorrhoidalis Kr. Polyphagous. Pakistan, Sudan.

Catantops somalicus Sjöst. (=*C. joycei* Dirsh). Cotton, sorghum, sunflower, sesame. Sudan, Somalia. Injurious to crops on occasion.

Chrotogonus homalodemus (Blanch.) (=*C. concavus* Kirby, *C. lugubris* Blanch.). Cotton, beans, wheat, rice, polyphagous. West Pakistan, Iran to Sudan. Major pest in outbreaks in West Pakistan; some importance in other areas.

Chrotogonus trachypterus robertsi Kirby. Cotton, tobacco, mustard, wheat, rice, many other crops. West Pakistan, Iran. Major pest in West Pakistan; minor pest in Iran.

Chrotogonus trachypterus trachypterus (Blanch.). Polyphagous, especially millet, sesame, tobacco, castorbean, cotton, vegetables. Afghanistan,* Pakistan, India. Heavy damage to vegetables at Lashkar Gar, Afghanistan, in 1961; major cotton and castorbean pest in Pakistan; particularly damaging to young crops.

Cyrtacanthacris tatarica (L.). Cotton, rice, acacia, beans, castorbean, sesame, other crops. Somalia, Sudan, Ethiopia, Kenya,* other areas of Africa south of Sahara, Pakistan, India. Usually solitary. Minor pest on cotton and other crops in Pakistan; economic importance on seedlings in Somalia and Ethiopia.

Dociostaurus kraussi (Ingen.). Cotton, other field crops. Iran, parts of U.S.S.R. Economic species.

Dociostaurus maroccanus (Thunb.), Moroccan locust. Cereals, cotton, vegetables, polyphagous. Cyprus, Syria, Iran, Afghanistan, Turkey, Israel, Iraq, Egypt, Libya, U.S.S.R. (some areas), southern Europe. Major pest in outbreaks; over 1 million acres controlled in 1960 in Iran; serious at times in Afghanistan; up to 70 percent of cereals destroyed some years in areas of Iraq; most important locust in Cyprus.

Eyprepocnemis noxia Dirsh. Cotton, sorghum. Sudan. Injurious, especially to sorghum grain.

Eyprepocnemis plorans (Charp.), berseem grasshopper. Cotton, berseem, sugarcane, other crops. Libya, Egypt, Israel, U.S.S.R. (Transcaucasia), Iran, Tunisia, Syria, Ethiopia, southern Europe. Most important grasshopper on field crops in Egypt; minor pest in Iran.

Kraussaria angulifera (Kr.). Millet, cotton. Sudan, Chad, Ethiopia. Considerable damage to millet.

Locusta migratoria (L.) (phase *solitaria* and *migratoria*). Sugarcane, rice, grape, other crops. Pakistan, India, Turkey, Israel, Lebanon,* Iraq, Iran, Egypt, parts of U.S.S.R. and Europe. Two generations in Turkey; in Mediterranean countries only solitary phase occurs. Minor pest in Pakistan and Iran; extensive damage to rice in Turkey.

Locusta migratoria migratorioides (R. & F.), African migratory locust. Graminaceous plants preferred, cotton, coffee, other plants during periods of stress. Ethiopia, Sudan, other sub-Sahara African areas, Israel. Caused heavy damage in outbreaks; probably only outbreak area in Africa near Timbuktu; best known outbreak began in 1928, covered most of continent in 5 years.

Nomadacris septemfasciata (Serv.), red locust. Grasses preferred, cotton, other plants. Usually found in solitary phase. Attacks cotton in Sudan and other areas south of Sahara; damage usually localized; last migratory outbreak began in 1930; outbreak areas exist in southwest Tanganyika and Northern Rhodesia.

Ochrilidia pruinosa (Brunn.). Cyprus. Common.

Oedaleus decorus (Germ.). Cotton, alfalfa, wheat, other field crops. Iran, parts of U.S.S.R. Economic species.

Oedaleus nigrofasciatus (DeG.). Polyphagous. Libya.

Oedaleus senegalensis (Kr.). Cotton, wheat, alfalfa, other crops. Sudan, Iran, West Pakistan,* West Africa. Economic importance in Iran.

Oedipoda caerulescens (L.). Cotton, tobacco, cereals, alfalfa, citrus, other plants. Iran, Libya, southern Europe to central Africa. Feeds on leaves and young plants. Some economic importance.

Oedipoda miniata (Pall.). Cotton, cucurbits, pastures. Cyprus, Iran, eastern Mediterranean. Common in Cyprus; minor pest in Iran.

Oxya velox (F.). Sugarcane, rice, cotton. Pakistan, India, east Asia. Minor pest in Pakistan.

Phymateus aegrotus (Gerst.). Field crops, polyphagous. Ethiopia, Somalia, Kenya, Tanganyika. May form small bands and cause local damage.

Phymateus pulcherrimus I. Bol. Field crops, polyphagous. Ethiopia (highlands). Forms bands and sometimes damages crops.

Phymateus viridipes Stål. Vegetables, trees, weeds. Sudan.*

Poekilocerus hieroglyphicus (Klug). Polyphagous. Egypt, Libya, India, Pakistan. Minor pest on sugarcane in Pakistan.

Poekilocerus pictus (F.). Bamboo, cotton, *Calotropis*. West Pakistan, India. Serious injury to bamboo and *Calotropis* at times; minor pest on cotton.

Pyrgodera armata F. W. Field crops. Iran, Israel. Economic species in Iran.

Schistocerca gregaria (Forsk.), desert locust. Polyphagous (damages many crops including cereals, forage, citrus, vegetables). Invades large areas of Africa and Middle East; may cause damage from Morocco to India to Aral Sea, U.S.S.R., southward; historically famous plague insect, causes widespread devastation and famine. Subject of extensive study and international control programs. Major pest. (Fig. 1.)

Sphingoderus carinatus (Sauss.). Desert plants, cotton, cereals. Afghanistan,* Iran, Iraq. Sometimes causes minor damage in Iran.

Sphingonotus azurescens (Ramb.). Polyphagous. Libya.

Thisoicetrinus pterostichus (F. W.). Tomato, eggplant, tobacco, cereals, cotton, alfalfa, other crops. Turkey, Iran, Israel, Iraq, U.S.S.R. Migrates from drying grass. Causes damage in Turkey; economic species in Iran.

Thisoicetrus littoralis (Ramb.). Cotton, cucurbits, other field crops. Egypt, Sudan, Cyprus. One of most important grasshoppers in Egypt.

FIGURE 1.—*Schistocerca gregaria* attacking millet.

Truxalis nasuta (L.). Cotton, grape, rice. Libya, Egypt, Jordan, Israel, West Pakistan. Of minor concern on cotton and rice in West Pakistan.

Tuarega insignis (Lucas). Desert shrubs, other plants. Libya.*

Zonocerus variegatus (L.). Cotton, palms, fruit trees, corn, many other plants. Sudan, other areas north of Equator. One of most important nonmigratory grasshoppers on cotton in Africa; injurious to many other crops.

Gryllidae (crickets)

Acheta domesticus (L.), house cricket, black head cricket. Cotton, wheat, stored products, grasses, other crops, polyphagous. Pakistan, Cyprus, Iran, Iraq, Sudan, Egypt, Israel, Libya, widespread. Serious outbreaks in cotton and other crops in Pakistan, where it is major pest, destroying autumn crops some years; important on stored products in Iran.

Brachytrupes megacephalus (Lef.). Roots of peanut, grasses, vegetables, nursery stock, polyphagous. Libya,* Tunisia. Serious pest in Libya; occasionally serious in Tunisia; some peanut plantings completely destroyed in Libya in 1962 and other years.

Gryllus bimaculatus DeG., two-spotted cricket. Cotton, tobacco, wheat, crucifers, cucurbits, other plants. Israel, Pakistan, Cyprus, Iran, Libya, Somalia, Ethiopia, Sudan, Tanganyika, Rhodesia. Attacks seedlings, causing economic damage. Major importance on wheat and crucifers in Pakistan; sporadic in Mediterranean countries.

Gryllus campestris L. Wheat, barley, cotton, tobacco, other crops, nursery plants. Iran, Libya, Greece. Feeds on young leaves, buds, young seedlings, causing medium to severe damage when populations are heavy enough.

Melanogryllus desertus (Pall.). Vegetables, other crops. Afghanistan,* Iran, Iraq, Cyprus. Economic species.

Oecanthus pellucens (Scop.). Cereals, cotton, grape, fruit trees, other plants. Libya, Iran, Cyprus, east Africa, U.S.S.R.

Tartarogryllus burdigalensis (Latr.). Iran, Iraq, Israel, U.S.S.R. (Transcaucasia). Cotton, beets, melons, other crops. Minor pest.

Gryllotalpidae (mole crickets)

Gryllotalpa africana P. de B., African mole cricket. Grass roots, cotton, tobacco, sugarcane, other crops. Libya,* Egypt, Israel, Ethiopia, Somalia, Pakistan, Iran, Afghanistan.* Serious pest in Iran; minor pest on tobacco in Pakistan.

Gryllotalpa gryllotalpa (L.) (=*vulgaris* Latr.), European mole cricket, common mole cricket. Cotton, tea, vegetables, nursery stock, corn, other plants. Turkey, Tunisia,* Lebanon,* Israel, Syria, Saudi Arabia, Libya, Cyprus, Iran, Iraq, Afghanistan,* Egypt, Europe.

Serious pest in Syria and Lebanon; heavy damage to roots of vegetables in Egypt and seedlings in Cyprus; serious damage also observed in Tunisia.

Gryllotalpa unispina Sauss. Vegetables, cotton. Iran, U.S.S.R. Serious pest in Iran.

Schizodactylidae

Schizodactylus monstrosus Drury. Polyphagous. Afghanistan,* Pakistan, India. Thought to be sometimes harmful to roots in local areas.

Tettigoniidae (longhorn grasshoppers)

Decticus albifrons (F.). Wheat, corn, cotton, melons, polyphagous. Iran, Cyprus, Libya, Israel, Iraq, other Mediterranean areas, southern U.S.S.R. Damages heads of cereals locally in Iraq and Libya some years.

Decticus annaelisae Ramme. Cotton, tobacco, corn, alfalfa, wheat, melons, many other crops. Iran. Feeds on leaves, stems, young seedlings. Some economic importance.

Tettigonia caudata (Charp.). Alfalfa, cotton, cereals. Afghanistan,* Iran, Iraq, U.S.S.R. (Transcaucasia). Economic species.

Tettigonia viridissima (L.). Cotton, cereals, beets, legumes, other plants. Cyprus, U.S.S.R. (Transcaucasia), Iraq, Iran, Greece. Economic species in Iran and Cyprus.

Dermaptera

Forficulidae (earwigs)

Forficula auricularia L., common or European earwig. Polyphagous, also scavenger and predator. Tunisia, Cyprus, Turkey,* Israel, Iran,* Libya, Egypt, north Africa through Europe to west Asia. (Fig. 2.)

Isoptera

Termitidae (termites)

Amitermes vilis (Hagen). Dry wood, roots and stems of field crops. Iran,* Iraq. Economic species in Iran.

Macrotermes herus (Sjöst.). Crops. Sudan.* Damaging infestations reported.

Microtermes obesi Holmgr. Sugarcane, grains, cotton, pepper, tomato, peanut, houses. West Pakistan, India. Attacks roots, causing death of plant. Major pest.

FIGURE 2.—*Forficula auricularia.*

Odontotermes obesus (Ramb.). Sugarcane, pepper, tomato, peanut, other crops. Pakistan, India. Major pest some years, especially in West Pakistan.

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips clarisetis Pries. Cabbage, beets, lemon, other plants. Egypt, Israel, southern Africa. Common in Egypt.

Thripidae (thrips)

Frankliniella intonsa (Tryb.). Wheat, flax, potato, lettuce, alfalfa. Iran, Europe. Attacks leaves, heads, flowers. Some economic importance.

Retithrips syriacus (Mayet) (=*aegyptiacus* March., *Dictyothrips zanoniana* Del Guer.). Grape, cotton, plum, walnut, persimmon, vegetables, other plants. Lebanon, Syria, Egypt, Libya, Israel, Somalia, Sudan,* other areas of Asia and Africa. Seven generations per year in Israel. Feeds on leaves and fruit, causing defoliation and shriveling. Important pest.

Scirtothrips dorsalis Hood. Pepper, eggplant, tomato preferred; beans, cotton, peanut, tea, other plants. Pakistan, India, southeast

Asia. Serious pest on peppers and tomato in West Pakistan in 1957; damaging pest in India.

Selenothrips rubrocinctus (Giard), red-banded thrips. Beans, mango, polyphagous. Sudan,* equatorial Africa.

Thrips angusticeps (Uzel), cabbage thrips. Grasses, crucifers, legumes, polyphagous. Libya, Egypt, Cyprus. Common in Egypt.

Thrips major Uzel. Polyphagous. Israel.

Thrips tabaci Lind., onion thrips. Cotton, cabbage, onion, beets, tobacco, polyphagous. Iran,* Iraq, Egypt, Libya, Turkey, Syria, Lebanon, Ethiopia, Pakistan, Cyprus, Israel, Somalia, Greece, widespread throughout world. Serious damage to cotton in Syria and tobacco in Turkey; destroys up to 75 percent of onion crop in some areas of Pakistan; may destroy 90 percent of young cotton in Lower Egypt; most serious thrips in Egypt. Important pest. Virus vector of tobacco, tomato, pineapple diseases.

Heteroptera

Coreidae (coreid bugs)

Anoplocnemis curvipes F. Mango, okra, fig, cotton, citrus, polyphagous. Somalia, Sudan,* tropical and equatorial Africa. Principal damage to tender shoots. Minor pest.

Leptoglossus membranaceus (F.). Citrus, cucurbits, vegetables. Sudan,* Rhodesia, southern Africa, wide areas of Africa and Asia. Damages citrus fruit, also cucurbits.

Lygaeidae (lygaeid bugs)

Leptodemus minutus (Jak.). Olive, orange, other plants. Libya.* May be of some importance.

Nysius cymoides (Spin.). Grape, other fruit, tobacco, crucifers, polyphagous. Egypt, Sudan, Cyprus, Israel. Common, importance apparently undetermined in Egypt; sometimes injurious in Cyprus; damaging to seed pods of crucifers in Israel.

Spilostethus (Lygaeus) pandurus (Scop.). Corn, sesame, grape, artichoke, tomato, cotton, fruit trees, other plants. Libya,* Lebanon,* Egypt, Sudan, Pakistan, Iraq, Iran, Ethiopia, Somalia, east Africa, India. Common in Egypt; minor importance in Pakistan; light infestations on artichoke reported from Ethiopia.

Miridae (plant bugs)

Campylomma diversicornis Reut. Cotton, cucurbits, castorbean. Iran,* Turkey, Greece, U.S.S.R. (Transcaucasia).

Campylomma nicolasi Put. & Reut. Cotton, corn, beans, sorghum, other plants. Turkey, Egypt, Sudan (irrigated areas), southern France. Attacks cotton bud, flower, stem, causing abnormal growth.

Creontiades pallidus (Ramb.), cotton square shedder. Cotton, clover, alfalfa, corn, grasses. Syria, Egypt, Libya, Aden, Sudan, Cyprus, Arabia, Turkey, Congo. Attacks cotton buds, flowers, stems; presence may be indicated by minute punctures on buds and bolls. Minor pest in Aden and Sudan; serious in Syria.

Deraeocoris punctulatus (Fall.). Alfalfa, grape, crucifers. Iran,* Afghanistan,* Turkey, Lebanon,* U.S.S.R. Species partly predaceous. Reported as common in alfalfa in some areas of Iran in 1958.

Helopeltis schoutedeni Reut. Cotton, legumes, mango, guava, many other hosts. Common *Helopeltis* species in Sudan, other north equatorial areas across Africa. Small numbers can cause considerable injury to cotton (*H. bergrothi* Reut. now known to be rare on cotton); produces dark-green sunken lesions, distortion, dwarfing, bunching of leaves.

Lygus gemellatus (H.-S.). Alfalfa, grasses, radish, polyphagous. Afghanistan,* Egypt. Light populations observed in alfalfa in Afghanistan.

Lygus pratensis (L.). Alfalfa, cotton, beets, potato, other plants. Lebanon,* Iran,* Turkey, Afghanistan, Europe through Asiatic Russia. Medium infestations observed in alfalfa in Iran.

Lygus rugulipennis Popp. Wheat, beets, alfalfa. Egypt, Turkey,* Europe. Species frequently confused with *L. pratensis*. Serious damage to wheat in U.S.S.R. and Finland; pest of alfalfa in Turkey.

Stenodema (Stenodema) laevigatum (L.). Alfalfa, cereals, cotton. Afghanistan,* Turkey. Mainly pest of cereals in Turkey; light populations observed in alfalfa in Afghanistan.

Taylorilygus pallidulus (Blanch.) (=*Lygus apicalis* Fieb.). Wheat, alfalfa, lentil, other crops. Egypt, other Mediterranean and African areas. Prevalent populations reported.

Trigonotylus brevipes Jak. Grasses, clover, beans, other plants. Egypt.

Pentatomidae (stink bugs)

Agonoscelis pubescens Thunb. (=*A. versicolor* (F.)), Sudan durra bug, andat bug. Sorghum, citrus, cotton, cucurbits, beans, sesame, other plants. Sudan,* Ethiopia,* Somalia, Egypt, widely distributed in Africa. Clusters in trees during resting periods. Can cause serious injury to sorghum; pest on cotton bolls; outbreaks follow year of heavy rainfall. Annual control campaign conducted in Sudan.

Calidea bohemani (Stål). Cotton, citrus, coffee, other plants. Ethiopia,* Sudan, Tanganyika, Rhodesia. Pest on cotton in Tanganyika only.

Calidea dregii Germ. Cotton, sorghum, sunflower, polyphagous. Sudan, Somalia, several countries south of Sahara. On cotton, attacks green bolls. Regarded as pest in Tanganyika.

Calidea duodecimpunctata (F.). Cotton, vegetables, alfalfa. Sudan.* Low numbers usually, but heavy local outbreaks some years.

Calidea nana (Hahn and H.-S.). Cotton, sesame, millet. Sudan. Occasionally serious pest.

Carpocoris pudicus (Poda). Cereals, crucifers, filbert, pistachio, other plants. Egypt, Lebanon,* Iran,* Europe, Afghanistan.* Injurious pest in some areas.

Carpocoris purpureipennis (DeG.). Wheat, other cereals, crucifers, potato, carrot. Afghanistan,* Turkey, Cyprus, Egypt, Libya, east Asia. Injurious to vegetables in east Asia.

Dolycoris baccarum (L.). Cereals, tobacco, vegetables, fruit, polyphagous. Egypt, Libya, Lebanon,* Iran,* Iraq,* Afghanistan,* Cyprus, Greece, Turkey, European U.S.S.R. Prefers young and soft parts of plants. Up to 70 per square meter reported in cereals in Iran in 1958; no important damage; minor pest in Libya; required controls in Cyprus.

Dolycoris penicillatus (Horv.). Wheat, tomato, alfalfa, cotton, sunflower. Iran, U.S.S.R. (Turkestan). Damages terminal parts of plant, flowers, fruit. Minor to medium economic importance.

Eusarcoris inconspicuus (H.-S.). Forage legumes, cotton, other low plants. Libya,* Egypt, Sudan, Cyprus, West Pakistan.* Common in Egypt.

Nezara viridula (L.), southern green stink bug, green vegetable bug. Corn, alfalfa, cotton, vegetables, polyphagous. Arabia, Egypt, Ethiopia,* Sudan,* Aden, Lebanon, Cyprus, Syria, Iran, Pakistan, Iraq, Israel, Turkey, Greece, widespread in temperate areas of world. May have four generations in Israel. Attacks developing fruit. Sometimes important on vegetables in Sudan; minor pest on cotton in Pakistan, Iran, Africa; not serious on cotton in Egypt. Important pest damaging many crops. (Fig. 3.)

Piezodorus lituratus (F.) (=*incarnatus* Germ.). Wheat, alfalfa(?), plum, okra. Iraq,* Tunisia,* Italy, Sudan,* U.S.S.R. (European). Collected on wheat heads in Iraq; damaging to plum in Italy; medium infestation reported on okra in Sudan.

Stenozygum coloratum (Klug). Polyphagous. Israel, Cyprus, Egypt. Limited importance in Israel; causes severe damage on *Capparis spinosa* in Egypt.

Rhopalidae (=Coreidae)

Liorhyssus hyalinus (F.). Tobacco, cotton, cereals, legumes. Libya, Egypt, Afghanistan,* Lebanon,* east Africa, Cyprus, U.S.S.R., other areas. Attacks cotton bolls. Common in Egypt; prevalent on tobacco seed heads in area of Afghanistan in 1961.

Homoptera

Aleyrodidae (whiteflies)

Bemisia tabaci (Genn.) (=*gossypiperda* M. & L.), cotton whitefly, sweetpotato whitefly. Cotton, cucurbits, tomato, many other plants.

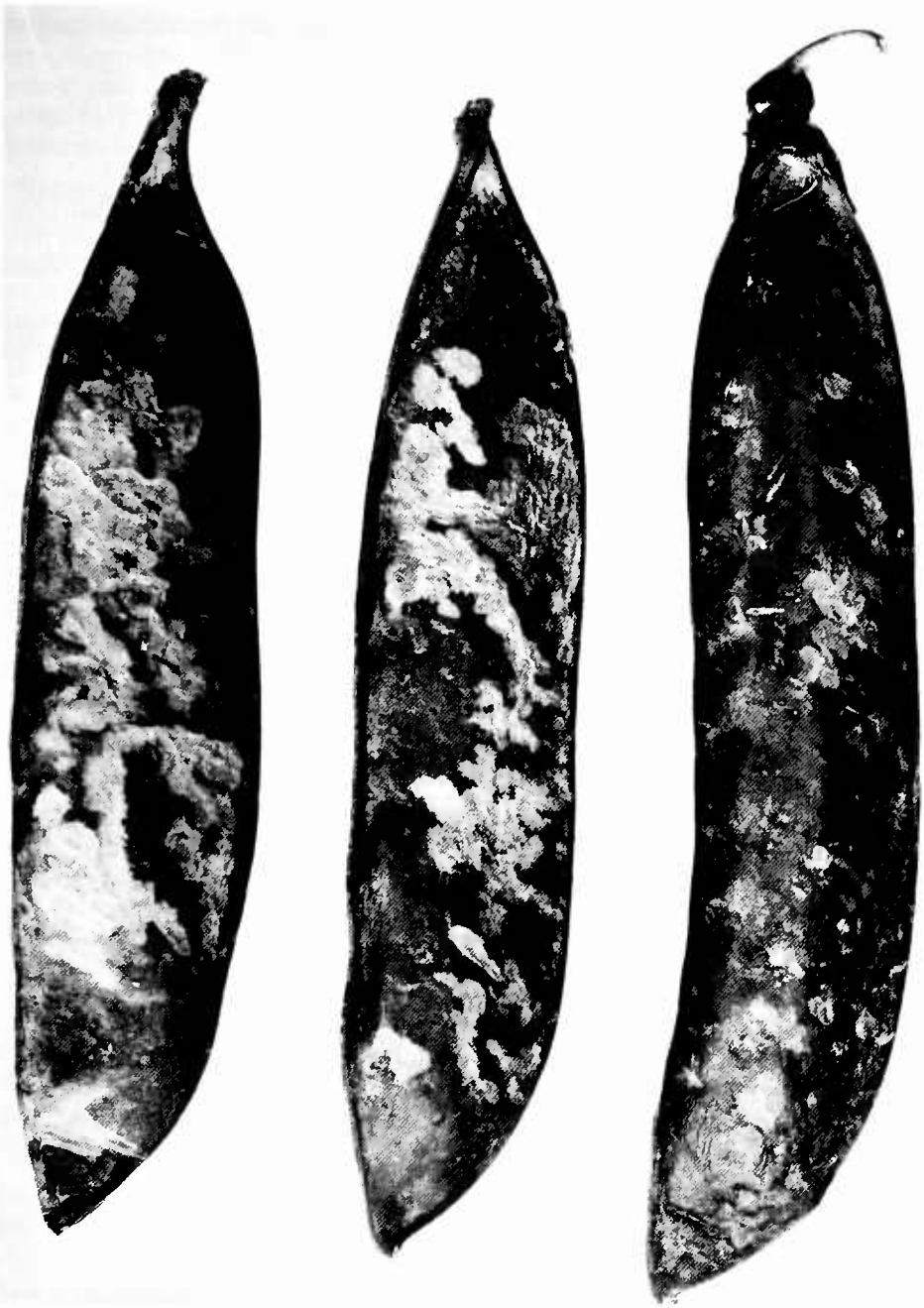

FIGURE 3.—*Nezara viridula* damage to peas.

West Pakistan, Iraq, Lebanon,* Israel, Iran, Aden, Afghanistan,* Libya,* Ethiopia, Somalia, Sudan,* Kenya, India, Portugal,* Greece, many other areas. Major pest on cotton in West Pakistan; serious in Sudan where it transmits leaf curl virus and causes direct injury; important pest on other crops.

Trialeurodes vaporariorum (Westw.), greenhouse whitefly. Cucurbits, tomato, hibiscus, hollyhock, other plants. Israel, Portugal,* Iran (greenhouse),* Ethiopia,* widely distributed. Heavy infestations

develop on cucurbit leaves causing wilting in Israel; tomato pest in many areas.

Aphidae (aphids)

Acyrthosiphon (Aulacorthum) solani (Kltb.), foxglove aphid (formerly in genus *Myzus*). Potato, tomato, other Solanaceae, polyphagous. Lebanon,* Israel, Ethiopia,* Europe, many other areas. Virus vector on potato and other plants.

Aphis gossypii Glov., cotton aphid, melon aphid. Cotton, cucurbits, many other plants. Egypt, Saudi Arabia, Israel, Syria, Aden, Ethiopia,* Somalia, Iran,* Libya,* Sudan,* Afghanistan,* Pakistan, Turkey, Iraq, Lebanon,* Cyprus, Jordan, cosmopolitan. Only aphid of importance on cotton in Africa; very injurious on cucurbits in Middle East, feeds on underside of leaves causing curling and wilting; severe cotton losses in Israel, Egypt, Turkey, Aden.

Myzus persicae (Sulz.), green peach aphid. Solanaceous crops, Rosaceae, many other plants. Tunisia,* Egypt, Iran,* Libya,* Ethiopia, Afghanistan,* Pakistan, Turkey, Syria, Lebanon,* Iraq, cosmopolitan. Sometimes causes heavy damage to tomato, tobacco, related crops; no serious damage in Middle East on fruit trees. Spreads virus diseases.

Smynthurodes betae Westw. (=*Trifidaphis phaseoli* (Pass.)), root louse. Peas, beans, cotton, pistachio, some other plants. Egypt, Israel, Iran, Turkey, India, Europe, other areas. Sometimes causes heavy damage to roots of crops; produces gall formations on pistachio leaves.

Asterolecaniidae (pit scales)

Asterolecanium pustulans (Ckll.). Fig, grape, cotton, many other plants. Egypt, Israel, east Africa. Produces deformed, pitted twigs. Sometimes injurious in Egypt and Israel; heaviest damage to fig in Egypt.

Cicadellidae (leafhoppers)

Empoasca decedens Paoli. Beets, cotton, citrus, other fruit trees. Afghanistan,* Iran,* Egypt, Israel, Cyprus, western Mediterranean. Heavy infestations observed on various crops in Afghanistan and on cotton in Iran.

Empoasca decipiens Paoli. Cotton, beets, grape, citrus, deciduous fruit, cucurbits, other plants. Egypt, Morocco, Afghanistan,* Iran,* West Pakistan, Israel, Cyprus, parts of Europe. Common in Spain; minor pest in Egypt; causes defoliation of grape in West Pakistan; heavy infestations observed on various crops in Afghanistan and on cotton in Iran.

Empoasca devastans Dist., cotton leafhopper. Cotton, potato, tomato, eggplant, okra, other plants. Afghanistan, Pakistan, India. Serious pest of cotton and potato in West Pakistan; common damaging cotton leafhopper of India; on cotton causes discoloration, rolling under, withering of leaves.

Empoasca dolichi Paoli. Cotton, peanut, other legumes. Somalia, Congo, southern Africa.

Empoasca facialis (Jac.), cotton leafhopper. Cotton, sweetpotato, castorbean. Sudan, Ethiopia, Somalia, areas south of Sahara. Heavy infestations may cause "hopperburn" and defoliation of cotton; one of two most important cotton leafhoppers in Africa. Serious pest.

Empoasca flavescens (F.). Cotton, eggplant, potato, hibiscus, tea, castorbean, fruit trees. Aden, Cyprus, Egypt, Pakistan. Minor pest in Pakistan.

Empoasca lybica (Berg.), cotton jassid, green leafhopper. More important on cotton, potato, tomato, eggplant, okra, grape, beans, feeds on many plants. Widespread in eastern Africa as far south as Tanganyika; Egypt, Israel, Spain, Saudi Arabia, Aden, Libya. As many as eight generations develop per year in Israel. One of most important cotton pests in Sudan, 600,000 acres treated in 1962; serious on grape and cotton in Spain; important on vegetables in Israel.

Erythroneura (Zyginidia) asiatica Kusn. Alfalfa, cotton, cucumber. Iran, U.S.S.R. (Turkestan). Attacks underside of leaves. Medium to severe infestations.

Erythroneura lubiae China. Cotton, legumes, other plants. Somalia, Sudan. Minor pest on cotton in Sudan. Economic species on beans.

Coccidae (soft scales)

Ceroplastes sinensis Del G., Chinese wax scale. Citrus, tea, grape, fig, pome and stone fruits, polyphagous. Iran, Turkey, Tunisia, U.S.S.R. (Transcaucasia), southern Europe. Important in some areas of Iran and Turkey; minor pest in Transcaucasia; serious infestations on citrus in Spain and Italy.

Coccus elongatus (Sign.) (=*longulus* Dougl.). Custardapple, coffee, acacia, some other plants. Lebanon,* Egypt, Ethiopia,* east Africa.

Coccus hesperidum L., brown soft scale. Citrus, fig, tea, oleander, acacia, other tropical and subtropical plants. Afghanistan (greenhouse),* Iran,* Lebanon,* Saudi Arabia, Libya, Israel, Turkey, Cyprus, Ethiopia,* Iraq, Syria, Egypt, Somalia, Sudan, Tunisia, widespread throughout world, frequently in greenhouses. Sometimes injurious to young citrus. Important in areas of Ethiopia and Libya. Damage mostly from honeydew. (Fig. 4.)

Coccus viridis (Green), green scale. Coffee, tea, citrus, mango, guava, other plants. Ethiopia, Sudan, east Africa, many other areas. Large numbers reported from Sudan.

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FIGURE 4.—*Coccus hesperidum.*

Pulvinaria psidii Mask., green shield scale, guava mealy scale, green top louse. Citrus, guava, coffee, mango, other trees. Tunisia, Egypt, other areas of Africa, parts of Asia including Pakistan. Some importance on citrus and mango in Pakistan.

Saissetia hemisphaerica (Targ.-Tozz.), hemispherical scale. Citrus, fig, tea, ornamentals, polyphagous. Turkey, Ethiopia,* Israel, Egypt, Afghanistan,* Pakistan, tropical and subtropical areas of world. Minor pest on guava; sometimes serious on tea in Pakistan; heavy infestations on citrus in Ethiopia.

Saissetia nigra (Nietn.). Cotton, false peppertree, tea, other plants. Pakistan, India, Egypt, Ethiopia,* other areas of Africa. Widespread

on cotton in Africa, often producing large amounts of honeydew leading to sooty molds; sometimes serious infestations in Pakistan.

Saissetia oleae (Bern.), black scale, olive soft scale. Olive, oleander, citrus, many other plants. Tunisia,* Turkey,* Libya, Iran, Syria, Lebanon, Israel, Somalia, Ethiopia, Cyprus, Egypt, widespread in subtropical and tropical regions of world. Heavy infestations on olive in Turkey and Libya; important on olive in Iran, killed many trees in 1958; main damage, honeydew; serious on citrus in some north African areas. Important pest.

Diaspididae (armored scales)

Aspidiotus britannicus Newst., holly scale (some authors place in *Dynaspidiotus*). Olive, carrot, holly, ivy, barberry, other plants. Cyprus, Lebanon, Libya, Jordan, Egypt. Infests leaves. Minor pest in Cyprus.

Aspidiotus camelliae Sign. (=*Hemiberlesia rapax* (Comst.)), greedy scale. Citrus, palms, ornamentals, many other hosts. Iran, Egypt, India, Europe, widespread. Some importance on citrus in Iran.

Aspidiotus cyanophylli Sign. *Pittosporum*, palms, fig, tea, coffee, other plants. Tunisia,* Greece, widespread in tropical areas and greenhouses.

Aspidiotus destructor Sign., coconut scale, bourbon scale. Coconut palm preferred, mango, banana, castorbean, papaya, many other plants. Egypt, Somalia, other African areas, Pakistan, Iran, south Asia. Chief pest of banana in Somalia; major pest of coconut in Pakistan, also important on mango; destructive to coconut palm and banana in other areas.

Aspidiotus hederae (Vall.), oleander scale. Olive, apple, mango, palms, oleander, citrus, polyphagous. Tunisia,* Libya,* Egypt, Jordan, Lebanon,* Iran, Cyprus, Turkey, Syria, Israel, Ethiopia,* southern Europe, general in tropical and subtropical areas of world. Prevalent and damaging in Tunisia; important in Israel, Iran, Lebanon; very serious in Syria. Serious pest of many plants. (Fig. 5.)

Aspidiotus (Hemiberlesia) lataniae Sign. Almond, apricot, mulberry, mango, rose, many woody plants. Ethiopia,* Sudan,* Lebanon, Egypt, Pakistan, Jordan, tropical and subtropical areas of world. Important in some areas of Libya; minor pest on guava in Pakistan.

Chrysomphalus (Mycetaspis) personatus (Comst.). Fig, mango, banana, citrus, other plants. Egypt.

Fiorinia fioriniae (Targ.-Tozz.). Polyphagous, especially palms. Egypt, Europe, northern and tropical Africa.

Melanaspis inopinata (Leon.). Pistachio, apple, almond, walnut, maple, ash. Lebanon, Iraq, Iran, Israel. Makes cavities on small branches. Serious pest.

Parlatoria cinerea Hadd. Citrus, apple, mango, other plants. West Pakistan, India, east Asia.

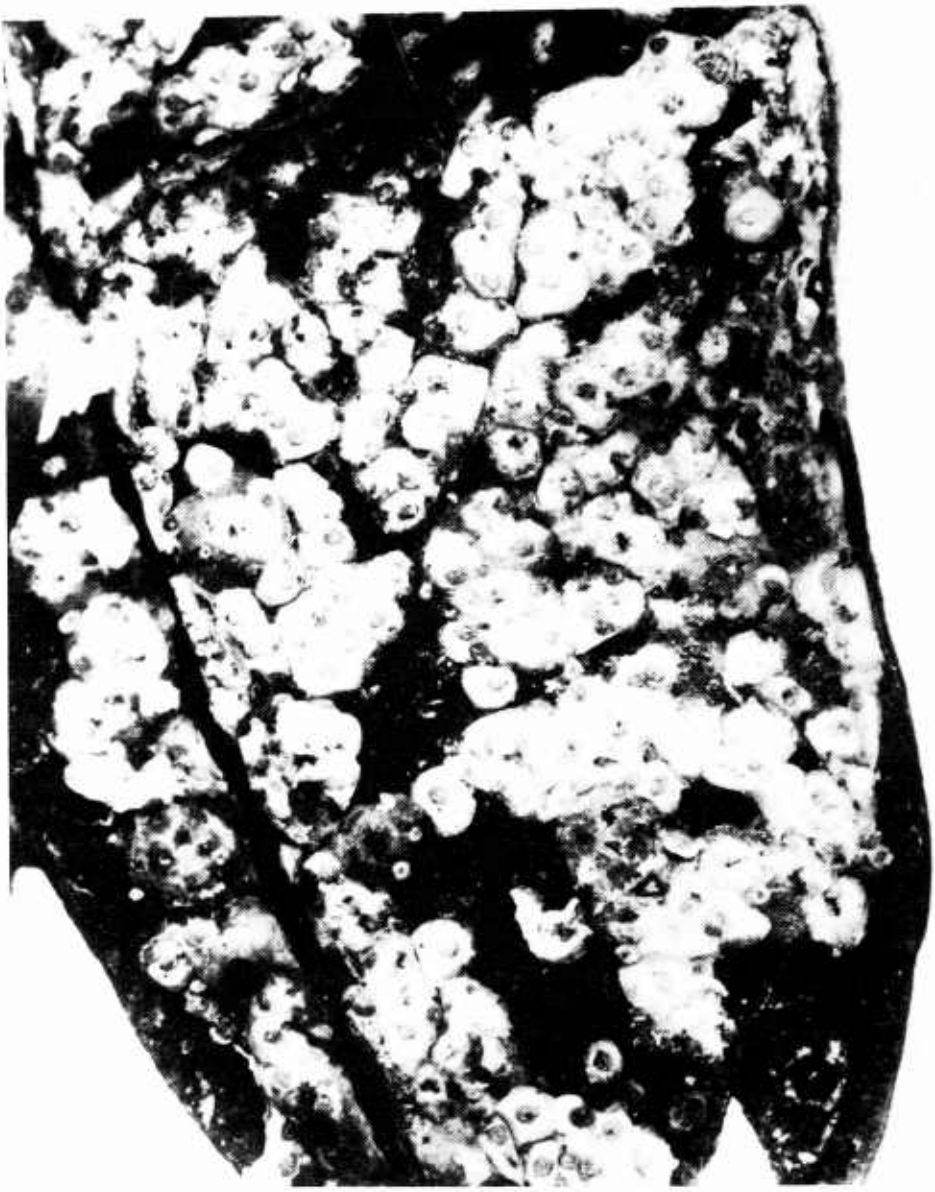

FIGURE 5.—*Aspidiotus hederae.*

Parlatoria oleae (Colv.), olive parlatoria, olive scale. Olive, pear, apple, citrus, stone fruit, other hosts. Turkey,* Iran, Libya, Egypt, Pakistan, Tunisia, Jordan, Lebanon, Israel, Cyprus, Syria, Iraq, southern Europe. Heavy infestations on olive in Turkey and olive and stone fruit in Libya; serious pest of fruit in Syria and Pakistan; no importance on citrus in Israel; minor pest on olive in Tunisia.

Pinnaspis aspidistrae (Sign.), fern scale. Citrus, fig, palms, polyphagous. Mediterranean basin, cosmopolitan.

Selenaspidus articulatus (Morg.). Palms, olive, oleander, ivy, other hosts. Ethiopia.* Observed in heavy scale infestation on palms in Ethiopia.

Margarodidae (margarodid scales)

Drosicha (Monophlebus) stebbingi (Green) (=*mangiferae* (Green)), mango mealybug, giant mealybug. Mango, citrus, guava, some other trees. West Pakistan, India. Serious pest, causing damage on terminals and branches.

Drosichiella (Monophlebus) tamarindus Green. Fig, citrus, banana, other plants. West Pakistan. Some importance.

Icerya aegyptiaca (Dougl.), Egyptian fluted scale, Egyptian mealybug. Over 100 hosts including fig, coffee, citrus, palms, tea, castor-bean. Egypt, Israel, Somalia, Tanganyika, Zanzibar, Kenya. Damaged shade trees in Egypt.

Icerya seychellarum (Westw.). Polyphagous, including citrus and many other fruits. West Pakistan through southeast Asia, southeast Africa.

Ortheziidae (ensign scales)

Orthezia insignis Browne, greenhouse orthezia. Citrus, rose, eggplant, sweetpotato, polyphagous. Egypt, other areas of Africa, Portugal,* widespread in other areas.

Pseudococcidae (mealybugs)

Ferrisia virgata (Ckll.), striped mealybug. Cotton, *Annona*, banana, citrus, legumes, tobacco, polyphagous. Egypt, Sudan, Somalia, Ethiopia,* other areas of Africa, Pakistan, other tropical areas. Sometimes locally severe in Africa, producing much honeydew; infests citrus in Sudan and Aden; severe infestations observed on *Annona* fruit at Dire Dawa, Ethiopia.

Nipaecoccus vastator (Mask.). (H. M. Morrison, U.S. Dept. Agr., considered *N. vastator* and *Pseudococcus filamentosus* Ckll. distinct but sometimes misidentified. Some other authors consider *P. filamentosus* a synonym of *N. vastator*.) Citrus, grape, cotton, polyphagous. Egypt, Iran, West Pakistan, east Africa, wide areas of equatorial Africa. Important on citrus in Egypt, destroyed shade trees in Cairo.

Phenacoccus hirsutus Green, hibiscus mealybug. Many plants, most important citrus, cotton, beans, peanut, trees, grape. Egypt, Sudan,* Pakistan eastward to New Guinea. Important pest of cotton in India, hibiscus in Philippines; most damaging mealybug on trees in Egypt; infestations required control on citrus in Khartoum Province, Sudan, in 1962.

Pseudococcus adonidum (L.), long-tailed mealybug. Fig, citrus, palms, coffee, grape, polyphagous. Tunisia,* Israel, Iran, Libya, Lebanon, Turkey, Egypt, other areas of Africa and Asia, southern Europe, cosmopolitan in warm climates and greenhouses. Common on citrus in Mediterranean area.

Pseudococcus (Dysmicoccus) brevipes (Ckll.), pineapple mealybug. Pineapple, sugarcane, palms, citrus, coffee, other plants. Sudan,* Egypt, east Africa. Associated with pineapple wilt disease; pest of sugarcane.

Pseudococcus (Planococcus) citri (Risso), citrus mealybug. Citrus, grape, coffee, date palm, banana, many other plants. Saudi Arabia, Libya, Lebanon, Israel, Syria, Turkey, Cyprus, Ethiopia, Sudan, Iran, Iraq, Egypt, Tunisia, tropical and subtropical areas of world. Feeds on all parts of plants including roots. Can cause severe injury in Mediterranean region; important on citrus in Israel.

Pseudococcus comstocki (Kuw.), Comstock mealybug. Citrus, apple, many other plants. Iran, Israel, India, widespread. Occasionally important on citrus in Israel.

Pseudococcus maritimus (Ehrh.), grape mealybug. Grape, citrus, pear, walnut, banana, other plants. Egypt, Iran, U.S.S.R. (Transcaucasia), many other areas. Severe infestations reported on citrus in Iran.

Pseudococcus (Nipaecoccus) nipae (Mask.), coconut mealybug. Palms, fig, grape, avocado. Mediterranean area, other tropical and subtropical areas.

Puto (Macrocerococcus) superbus (Leon.). Polyphagous. Iran, southern U.S.S.R., Mediterranean area.

Lepidoptera

Arctiidae (tiger moths)

Amsacta lactinea (Cram.). Cotton, castorbean, rice, sunflower. Pakistan, India. Minor pest on cotton; severe on rice seedlings.

Amsacta moorei (Butl.). Cotton, cowpea, peanut, corn, sorghum, castorbean. Pakistan, India. Minor pest on cotton seedlings in Pakistan; some importance on other crops; corn among favored host plants.

Diacrisia investigatorum (Karsch). Alfalfa, cereals, cotton, many other plants. Somalia, Ethiopia, Nyasaland, Uganda. Attacks cotton seedlings in Ethiopia, occasionally occurs in outbreaks.

Diacrisia obliqua (Wlk.), jute hairy caterpillar. Beans, sesame, peanut, jute, cotton, corn, rice, other plants. Pakistan, India, east Asia. Can cause complete defoliation of crops. Major pest of peanut, castorbean, jute, other crops in Pakistan.

Pericallia ricini (F.). Cotton, castorbean, cucurbits, *Calotropis*. West Pakistan. Minor pest on leaves.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Agrotis flammatra (Denis & Schiff.). Grains, potato, tobacco, cotton. Syria, Iran, Pakistan, India, U.S.S.R. (Transcaucasia), Europe. Damaging pest.

Agrotis ipsilon (Hufn.), black cutworm, greasy cutworm, dark sword grass moth. Cotton, grasses, tobacco, peanut, vegetables, many other plants. Lebanon,* Cyprus, Afghanistan,* Pakistan, Libya,* Tunisia, Syria, Israel, Egypt, Sudan, Iraq, Turkey, U.S.S.R. (Transcaucasia), probably cosmopolitan. Important on many crops; pest of seedlings; serious in many areas. Most troublesome cutworm in Egypt; as much as 15-percent damage to field crops by *Agrotis* spp. in Turkey.

Agrotis orbona (Hufn.). Many plants, mainly herbaceous ornamentals. Tunisia.

Agrotis pronuba (L.), large yellow underwing. Cereals, beans, tobacco, grape, beets, other root crops, polyphagous. Libya,* Tunisia, Lebanon, Iraq, Turkey, Israel, Europe, U.S.S.R. (Transcaucasia). Injurious to vegetables in Libya, tobacco in Turkey; serious in Lebanon.

Anua tirhaca (Cram.). Pomegranate, pistachio, myrtle, polyphagous. Iraq, Libya, Egypt, Tunisia, Cyprus, Old World tropical and subtropical areas. Damaging in Iraq; fruit-piercing moth in some areas.

Autographa gamma (L.), silver-y moth. Peas, alfalfa, beets, polyphagous, especially vegetables. Arabia, Lebanon, Libya, Tunisia, Turkey, Iraq, Iran, Cyprus, Egypt, Europe through Asia. Damaging in periodic outbreaks, less severe in west Asia than Europe.

Chrysodeixis chalcites (Esp.). Solanaceous crops, cotton, corn, beans, crucifers, wild herbs. Iraq, Tunisia, Libya, Lebanon, Cyprus, Israel, Egypt, Greece, tropical and subtropical areas of Old World. Vegetable pest in many parts of world; important on tomato in Tunisia; chemical control seldom necessary in Near East.

Cornutiplusia circumflexa (L.). Cotton, vegetables, many other plants. Iraq, Turkey, Iran, U.S.S.R. (Transcaucasia, Turkestan).

Diachrysia orichalcea (F.). Cotton, cabbage, beans, cucurbits, polyphagous. Pakistan, Libya,* Egypt, India, Ethiopia,* east Africa; widespread in Old World tropical areas. Can be damaging to vegetables; major pest of cabbage in Pakistan.

Eublemma brachygonia Hmpsn. Castorbean, sorghum, corn, tomato, cotton. Sudan, Somalia, Uganda, other areas of Africa. Attacks seeds.

Euxoa conspicua (Hbn.). Beets, cabbage, watermelon, cotton, tobacco, flax, wheat, barley, other crops. Iran, Arabia, Pakistan, Europe into Asia. Larvae attack germinating seeds, stems and roots of young plants. Severe pest in Iran.

Euxoa segetum (Denis & Schiff.), turnip moth, winter cutworm. Polyphagous, especially grains, cotton, tobacco, beets, potato, crucifers. Libya,* Tunisia, Lebanon, Ethiopia, Sudan, Arabia, Israel, Egypt, Turkey, Iraq, Syria, Iran, Pakistan, other areas in Asia, Africa, Europe. Major damage to potato in Pakistan, important on tobacco; widespread damage to beets and potato in Europe; 1 year's loss in Russia was 500,000 acres of crops; observed destroying crucifer transplants in Ethiopia. Important pest.

Euxoa spinifera (Hbn.). Cotton, tobacco, corn, beets, other plants. Tunisia, Aden, Iraq, Turkey, Cyprus, Arabia, Egypt, Libya, Sudan, Israel, Pakistan, India, east Africa, U.S.S.R. (Transcaucasia). Minor pest in Pakistan, other areas; can cause important damage in Tunisia.

Feltia exclamationis (L.), heart and dart moth. Root crops, cereals, tobacco, other plants. Iraq, Libya, Turkey, Iran, Europe, central Asia. Severe damage to transplants in Iran; important pest in other areas.

Heliothis armigera (Hbn.), Old World bollworm, African cotton bollworm. Cotton, tobacco, tomato, corn, okra, legumes, polyphagous. Ethiopia, Somalia, Iran,* Aden, Turkey, Cyprus, Yemen,* Tunisia, Libya, Sudan, Iraq, Syria, Pakistan, Afghanistan, Egypt. (Together with *H. zea*, cosmopolitan.) Major pest causing loss on many crops; important on cotton and tobacco in Iran; low populations in Egypt; minor pest on cotton in Pakistan, but major pest on corn; heavy damage to tomato, cotton, okra reported from Sudan and to beans in Libya.

Heliothis dipsacea (L.). Corn, flax, soybean, tobacco, tomato, cotton, beets, peas, alfalfa. Iran, U.S.S.R. Larvae feed on leaves and fruit. Severe damage reported in Iran.

Heliothis nubigera H.-S. Watermelon, tobacco, tomato, apple, wild plants. Libya, Tunisia, Egypt, Israel, Syria, other Mediterranean areas, Somalia, wide areas of Asia. Damages leaves and young fruit occasionally in Egypt; heavy damage in Tunisia.

Heliothis peltigera (Denis & Schiff.). Cotton, tobacco, sorghum, sunflower, ornamentals, polyphagous. Iraq, Turkey, Iran, Israel, Egypt, Libya, Tunisia, Sudan, rather wide subtropical range. Attacks buds and floral parts. Damaging in Iraq, Iran, Tunisia; heavy damage to cotton reported from Sudan.

Mamestra brassicae (L.), cabbage moth. Polyphagous, crucifers probably damaged most. Europe through Asia to Japan including Turkey, Lebanon, Syria, Iran, West Pakistan, Libya, Canary Islands. Destructive to vegetables; annual loss on cabbage in Bulgaria 20–30 percent; reported as pest in Lebanon and Syria.

Parallelia algira (L.). Pomegranate, *Rubus* sp., castorbean, other plants. Egypt, Iraq, Israel, India. Important pest of castorbean in India, feeds on leaves.

Peridroma saucia (Hbn.), variegated cutworm. Polyphagous. Tunisia, Lebanon,* Israel, other Mediterranean countries, widespread. Does not develop into heavy populations.

Prodenia litura (F.), Egyptian cottonworm, tobacco caterpillar, tomato caterpillar, greater alfalfa caterpillar. Polyphagous, most important on cotton, alfalfa, tobacco, vegetables. Turkey, Israel, Cyprus, Arabia, Aden, Libya, Egypt, Sudan, Iran, Iraq, Afghanistan, Pakistan, Ethiopia, Somalia, Syria, Tunisia, other areas of Africa, Asia, Australia. Severe outbreaks seriously damage many plants in tropical and subtropical areas; loss of one-half million bales of cotton reported from Egypt in 1938, but only occasionally important on cotton outside Egypt; major pest of tobacco in Pakistan, beets in Israel, alfalfa in Libya; required controls on beans in Sudan; major pest of vegetable areas in Iran. Major pest. (Fig. 6.)

FIGURE 6.—*Prodenia litura* larva.

Spodoptera exigua (Hbn.), beet armyworm, lesser armyworm. Grasses, alfalfa, okra, cotton, potato, peanut, beets, other plants. Saudi Arabia, Egypt, Iran,* Aden, Yemen,* Libya,* Israel, Somalia, Sudan, Pakistan, Iraq, Syria, Jordan, Afghanistan,* Turkey, Cyprus, Greece, India, widespread over world. Five generations per season in Iran. Many beetfields destroyed in Iran some years; serious on peanut in Libya, jute and other crops in Pakistan; requires controls on cotton, alfalfa, other crops in Sudan. Major pest in many countries.

Trichoplusia ni (Hbn.), lettuce looper, cabbage looper. Crucifers, lettuce, cotton, potato, beets, other plants. Saudi Arabia, Libya,* Iran,* Pakistan, Israel, Iraq, Egypt, Sudan. Referred to as migratory garden pest. Minor pest in Iran and Pakistan; some damage in Israel.

Nymphalidae (brush-footed butterflies)

Acraea terpsichore (L.), sweetpotato caterpillar. Sweetpotato, tobacco, hibiscus. Somalia, Uganda.

Nymphalis polychloros (L.). Peas, cotton, fruit, other trees. Cyprus, Europe into Siberia. Minor pest.

Vanessa cardui (L.), painted lady. Cotton, hollyhock, beans, melons, artichoke, other plants. Syria, Iraq, Iran, Jordan, Cyprus, Israel, Arabia, Libya, Egypt, Sudan, Tunisia, Ethiopia, Europe, widespread. Serious on artichoke in Cyprus and Ethiopia some years; occasionally requires controls on vegetables.

Olethreutidae

Cryptophlebia leucotreta (Meyr.), false codling moth. Citrus, sorghum, walnut, cotton, corn, olive, stone fruit, many other plants. Most of Africa south of 20th parallel including Ethiopia* and Somalia. As many as six generations per year. Attacks fruit and seed. Important pest of citrus and cotton; feeds in corn ears; one of principal plant pests in Uganda and Rhodesias.

Phycitidae

Cryptoblabes gnidiella (Mill.), honeydew moth. Citrus, other fruits, corn, cotton, other plants. Egypt, Libya,* Turkey, Israel, Cyprus, other Mediterranean areas. Regarded as secondary feeder, no serious primary damage; moths attracted to honeydew. In Israel not regarded as important on citrus, causing only occasional fruit drop; prevalent in damaged corn ears in Egypt.

Ectomyelois ceratoniae (Zell.), carob moth, orangeworm. Dried fig, raisins, almond, coffee, date, carob, orange. Israel, Turkey, Cyprus, Tunisia, Libya, Egypt, other areas of Mediterranean and Africa. Pest of orange; penetrates deeply into citrus fruit, causing an exudate; damage to fig in Libya, date in Egypt, carob bean in Cyprus.

Pyraustidae (pyraustid moths)

Dichocrocis punctiferalis Gn., yellow peach moth. Cotton, corn, tree fruits, castorbean, many plants. Pakistan, India, eastern Asia to Australia. Minor pest on cotton in Pakistan, but serious in Australia, attacks boll and stem; important on peach in China; damage to guava and castorbean reported from Pakistan.

Ostrinia nubilalis (Hbn.), European corn borer. Corn, pepper, cotton, many other plants. Egypt, Iran,* Lebanon, Cyprus, Syria, Israel, Pakistan, Turkey, Libya, Europe into central Asia. Minor pest on cotton; heavy damage on corn in Lebanon, Egypt, Syria; important on this crop in Turkey; minor pest in Iran.

Sphingidae (sphinx moths)

Acherontia atropos (L.), death's head hawk moth. Potato, eggplant, olive, tomato, legumes, sesame, composites. Egypt, Libya, Lebanon, Cyprus, Turkey, Arabia, Tunisia, Iran, southern Europe. Moths enter beehives where they are reported to feed on honey. Injurious defoliator on many plants; some damage to potato in Libya and olive in Tunisia; potato apparently most common host.

Acherontia styx Westw., eastern death's head moth. Grape, solanaceous crops, beans, pumpkin, sweetpotato. Iraq, Afghanistan, Pakistan, southeastern Asia. Reported as important on grape in Afghanistan; minor pest in Pakistan.

Coleoptera

Bostrichidae (false powder-post beetles)

Apate monacha F., date palm bostrichid. Palms, mango, grape, coffee, acacia, citrus, other plants. Tunisia, Syria, Libya,* Israel, Lebanon,* other Mediterranean areas, Ethiopia, tropical Africa. Adults bore into bark and wood, may kill tree; bore into palm leaf midrib; often found in weakened trees. Pest of coffee in east Africa.

Chrysomelidae (leaf beetles)

Altica pyritosa Erich. Flax, sweetpotato, other plants. Ethiopia (determined as *Haltica pyritosa* Erich.),† Sudan (one specimen). Heavy populations in Ethiopia.

Aphthona fuentei Reit. Cotton, alfalfa, sweetpotato, other plants. Sudan, Egypt, other Mediterranean countries. Occasional minor pest of cotton.

Aphthona latipennis Pic. Cotton, alfalfa, sorghum, tobacco, mango, other plants. Sudan. Occasional minor pest.

Aphthona whitfieldi Bryant. Melons, castorbean, mango, pistachio, cowpea, some other plants. Sudan. Damages mango and pistachio leaves.

Hermaeophaga ruficollis (Lucas). Castorbean, cotton, *Dolichos lablab*. Sudan, Egypt, other Mediterranean areas. Minor pest of foliage in Sudan and Egypt; may cause important damage on castorbean in Israel.

Curculionidae (weevils)

Apion aestivum Germ. Alfalfa, clover, beans, cotton. Iran, Israel, parts of Europe and U.S.S.R. Adults feed on leaves, but most important damage by larvae feeding on young seed. Minor pest on cotton in Iran, larvae bore into buds and stems causing galls; economic species in Israel, common in alfalfa.

Myllocerus undecimpustulatus Faust. Sugarcane, guava, pomegranate, mango, okra. West Pakistan. Minor pest.

Platymycterus marmoratus (Faust) (=*kirghiscus* (Faust)). *Cytisus*, almond, rose. Afghanistan.‡ Very heavy adult populations observed, noticeable feeding injury on leaves.

Tanymecus dilaticollis Gyll. Cereals, fruit trees, beets, other field crops. Turkey, Cyprus, southern Europe. Very injurious in northern Turkey on sprouting grain, especially corn seedlings, up to 50- to 100-percent damage reported; damages trees and beets.

Tanymecus indicus Faust. Wheat, corn, cotton, beets, jute, safflower, other plants. Pakistan, India. Sporadic in occurrence. Major pest of wheat in Pakistan, but apparently minor pest on other crops.

Elateridae (wireworms)

Agriotes lineatus (L.). Carrot, corn, beets, tobacco, wheat, cotton, nursery plants, other crops. Israel, Iran, Greece. Larvae attack germinating seeds and roots, cause medium to severe damage.

Agriotes meticulosus Cand. Potato, tomato, cotton, crucifers. West Pakistan, U.S.S.R. (Transcaucasia, Turkestan). Considerable damage to potato in Baluchistan, West Pakistan.

Agriotes pilosus (Panz.). Carrot, corn, lettuce, potato, beets, polyphagous. Iran. Larvae damage germinating seeds and roots. In eastern Mediterranean area wireworms not so troublesome as in central Europe and North America.

Cardiphorus rufipes (Goeze). Seeds and roots. Israel. Damaging on new land.

Meloidae (blister beetles)

Epicauta albovittata Gestro. Beans, cucurbits, Malvaceae, other plants. Somalia, Tanganyika. Injurious to beans in Somalia.

Epicauta erythrocephala Pall. Beets, alfalfa, potato, cotton, melons. Iran, U.S.S.R. (Turkestan, Transcaucasia). Adults feed on young leaves and buds, causing minor to medium damage.

Zonabris tenebrosa Lap. Polyphagous. Libya.

Scarabaeidae (scarabs)

Adoretus versutus Har. Shade trees, ornamentals. West Pakistan, Uganda. Outbreaks of adults defoliate trees.

Anomala egregia Gahan. Cereals, beans, castorbean, many other plants. Somalia. Larvae attack roots.

Anomala plebeja (Ol.). Cereals, beans, castorbean, many other plants. Somalia. Larvae attack roots.

Anoxia pilosa (F.). Fruit trees, grape, cereals, polyphagous. Iran, U.S.S.R. Larvae damaging, particularly to young nurseries.

Epicometis hirta Poda. Rosaceous fruit, wheat, flowers of other plants. Iran, Turkey, Cyprus, Europe. Attacks flowers, especially damaging to pomegranate.

Melolontha melolontha (L.). General feeder. Europe, Turkey. Major pest in Europe; damages roots of tea in Turkey.

Oxythyrea abigail Reiche & Saulcy. Ornamentals, wheat, almond, polyphagous. Cyprus, Egypt, Israel. Found in flowers of many plants.

Oxythyrea cinctella (Schaum). Rosaceous fruit, citrus, wheat, grape, cucurbits, other plants. Iran, Egypt, Pakistan, Greece, U.S.S.R. (Tashkent). Adults attack flowers. Medium to severe damage in Iran; minor pest in Pakistan.

Oxythyrea funesta (Poda). Citrus, deciduous fruit, castorbean, cabbage, other plants. Libya, Bulgaria, Italy, Spain, Greece. Attacks flowers. Serious losses in Bulgaria; minor pest in Libya.

Oxythyrea pantherina (Gory & Perch.). Wheat, barley, citrus, beans, pome and stone fruits. Libya. Can cause important damage to cereals; feeds on flowers of fruit.

Pachnoda interrupta (Ol.). Citrus, rose, sorghum. Ethiopia.*

Pentodon bispinifrons Reit. Grape, other fruit, rose, sugarcane, other plants. Jordan, Israel, Pakistan. Injurious species.

Pentodon idiota (Hbst.). Sugarcane, beets, watermelon, other fruit, corn, polyphagous. Iran, Pakistan, Jordan. Larvae damage roots, 3-year life cycle. Important on sugarcane, up to 90-percent loss in some areas.

Polyphylla fullo (L.). Nursery stock, tea, tobacco, vegetables, other crops. Lebanon, Syria, Turkey, Israel, Greece, U.S.S.R., other areas. Larvae feed on roots. Serious pest in Syria; minor pest in Israel; can be serious in Lebanon; some records of *P. fullo* damage in Mediterranean area may be erroneous.

Polyphylla olivieri (Lap). Young fruit trees, grape, beets, polyphagous. Iran. Life cycle 3 or more years; adults appear in June. Feeds on roots of many crops. Most damaging scarab in Iran.

Rhizotrogus aequinoctialis (Hbst.). Gladiolus, lettuce, carnation. Turkey. Larval damage reported severe in area of Turkey.

Schizonycha sp. Cotton, peanut, *Dolichos lablab*, sorghum. Sudan. Larvae serious on *D. lablab* and sorghum.

Tropinota squalida (Scop.), furry rose beetle. Deciduous fruit, barley, beans, citrus, grape. Libya,* Israel, Egypt, Lebanon, Iraq, Iran, Pakistan, Greece. Feeds in flowers. Damaging to beans and cereal in Libya; not damaging to citrus flowers in Israel; minor pest in Iran; some damage in Egypt; severe on cherry in Pakistan.

Tenebrionidae (darkling beetles)

Gonocephalum (Dasus) simplex (F.). Corn, cotton, tobacco, beans, coffee, other crops. Somalia, tropical Africa. Some damage to tobacco transplants, corn seedlings, vegetables. Usually minor pest.

Opatroides punctulatus Brullé. Tobacco, cotton, mulberry, watermelon, other plants, stored products. Libya, Cyprus, Egypt, Israel, Turkey, Iran, Greece, Pakistan, U.S.S.R. (Turkestan). Damages young tobacco plants, causing replanting in Turkey some years; minor pest in Iran; attacks bark of young mulberry in Libya; damages sown seeds and germinating plants in Israel.

Hymenoptera

Vespidae (hornets)

Vespa orientalis L., oriental hornet. Grape, date, citrus, pear, fruit and bark of many plants, honeybees, omnivorous feeder. Afghanistan,* Cyprus, Pakistan, Lebanon,* Turkey, Iraq, Iran, Israel, Egypt, Ethiopia, Arabia, southern Europe. Gnaws bark of young trees, feeds on fruit, attacks bees and beehives, painful stinger, nests in mud

walls. Damages ripe fruit and raisins up to 50 percent in Afghanistan; damaging pest also in Israel. A chief enemy of honeybees in Israel and Egypt. Serious pest.

Diptera

Agromyzidae (leaf miner flies)

Phytomyza atricornis Meig., pea leaf miner. Peas, crucifers, potato, alfalfa, other plants. Libya,* Pakistan, India, Israel, Egypt, Europe, cosmopolitan. Can cause severe injury; important on peas and fava bean in Libya; controls not warranted in Israel.

Anthomyiidae

Hylemya platura (Meig.) (=*cilicrura* (Rond.)), seed-corn maggot. Corn, beans, cucurbits, other germinating seeds. Libya, Ethiopia, Turkey, Cyprus, Iran, Greece, many other areas of world. Important in Israel.

Bibionidae (march flies)

Bibio hortulanus (L.). Tobacco, cereals, beets. Libya,* Turkey. Severe damage to tobacco seedlings in Libya.

Lonchaeidae

Lamprolonchaea aurea (Macq.) (=*splendida* Lw.). Pepper, citrus, potato, cotton, corn. Libya,* Uganda, Cyprus. Secondary pest, usually follows attack of other insects, especially *Ceratitis capitata;* follows bollworms in cotton.

Tipulidae (crane flies)

Tipula oleracea L. Beets, crucifers, cereals, legumes, potato, other plants. Turkey, other Mediterranean areas, Europe. Larvae can cause heavy damage in Europe; importance in Turkey not known.

CEREAL INSECTS

Principal crop species: Barley (*Hordeum* spp.), corn (Indian corn, maize) (*Zea mays* and varieties), millet (*Echinochloa*, *Eleusine*, *Pennisetum*, *Setaria*, *Panicum*), oats (*Avena sativa* and *Avena* spp.), rice (*Oryza sativa* and subspecies), rye (*Secale cereale*), sorghum (durra) (*Sorghum vulgare* and varieties), sugarcane (*Saccharum officinarum*), wheat (*Triticum* spp.).

Acarina

Eupodidae (eupodid mites)

Penthaleus major (Dug.), winter grain mite. Wheat, barley, pastures. Iraq,* Cyprus. Injurious on small grains.

Tetranychidae (spider mites)

Oligonychus indicus (Hirst). Sugarcane, sorghum. West Pakistan. Severe damage reported from West Pakistan.

Petrobia latens (M.), brown wheat mite. Wheat, chickpea. Lebanon,* Libya. Can be serious pest of wheat. Importance in northeast Africa-southwest Asia unknown.

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

Caloptenopsis insignis clara (Wlk.). Millet. Sudan. Damages maturing grain.

Catantops axillaris axillaris (Thunb.). Millet. Sudan, Egypt. Damages maturing grain, migrates into millet.

Cyrtacanthacris sulphurea Johns. Sorghum. Sudan.

Hieroglyphus daganensis Kr. Millet. Sudan, Chad. Considerable damage recorded.

Notostaurus anatolicus (Kr.). Cereals. Jordan, Israel, Iran. Minor pest in Iran.

Pnorisa carinata Uv. Millet. Sudan. Damages seedlings occasionally.

Ramburiella turcomana (F. W.). Wheat, barley, other field crops. Iran. Economic species.

See also following species under Polyphagous Insects:

Acrotylus insubricus (Scop.)

Aiolopus savignyi (Kr.)

Aiolopus strepens (Latr.)

Anacridium moestum melanorhodon (Wlk.)

Arcyptera labiata (Brullé)

Calliptamus barbarus Costa

Calliptamus italicus (L.)

Calliptamus palaestinenis Ramme

Calliptamus turanicus Tarb.

Catantops somalicus Sjöst.

Chrotogonus homalodemus (Blanch.)
Chrotogonus trachypterus robertsi Kirby
Chrotogonus trachypterus trachypterus (Blanch.)
Cyrtacanthacris tatarica (L.)
Dociostaurus kraussi (Ingen.)
Dociostaurus maroccanus Thunb.
Eyprepocnemis noxia Dirsh.
Eyprepocnemis plorans (Charp.)
Kraussaria angulifera (Kr.)
Locusta migratoria (L.)
Locusta migratoria migratorioides (R. & F.)
Nomadacris septemfasciata (Serv.)
Oedaleus decorus (Germ.)
Oedaleus senegalensis (Kr.)
Oedipoda caerulescens (L.)
Oedipoda miniata (Pall.)
Oxya velox (F.)
Phymateus aegrotus (Gerst.)
Phymateus pulcherrimus I. Bol.
Poekilocerus hieroglyphicus Klug
Pyrgodera armata F. W.
Schistocerca gregaria (Forsk.)
Sphingoderus carinatus (Sauss.)
Thisoicetrinus pterostichus (F. W.)
Thisoicetrus littoralis (Ramb.)
Truxalis nasuta (L.)

Gryllidae (crickets)

See following species under Polyphagous Insects:
Acheta domesticus (L.)
Gryllus bimaculatus DeG.
Gryllus campestris L.
Oecanthus pellucens (Scop.)

Gryllotalpidae (mole crickets)

See following species under Polyphagous Insects:
Gryllotalpa africana P. de B.
Gryllotalpa gryllotalpa (L.)

Tettigoniidae (longhorn grasshoppers)

Decticus verrucivorus (L.). Cereals, cotton. Iran, Italy, U.S.S.R. (Transcaucasia). Economic species in Iran.

See also following species under Polyphagous Insects:

Decticus annaelisae Ramme

Tettigonia caudata (Charp.)

Tettigonia viridissima (L.)

Dermaptera

Forficulidae (earwigs)

Forficula senegalensis Serv. Corn. Ethiopia.* Prevalent under sheaths, but apparently not damaging.

Isoptera

Termitidae (termites)

Odontotermes O. classicus (Sjöst.). Cereals. Somalia, Ethiopia.

Odontotermes O. taprobanes (Wlk.). Sugarcane. West Pakistan, India. Minor pest.

See also following species under Polyphagous Insects:

Microtermes obesi Holmgr.

Odontotermes obesus (Ramb.)

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips tritici (Kurd.). Wheat, other grains. Iran, Iraq,* Turkey, Israel, Afghanistan,* Morocco, Italy. Heavy populations noted on wheat in Iraq and Afghanistan; economic pest in Iran.

Thripidae (thrips)

Anaphothrips alternans (Bagn.). Corn. Somalia, Libya. Lives under leaf sheaths.

Frankliniella dampfi Pries. (See under Cotton Insects.)

Frankliniella intonsa (Tryb.). (See under Polyphagous Insects.)

Limothrips cerealium (Haliday), grain thrips. Small grains, sugarcane. Libya, Cyprus, Egypt, Israel, Greece. Large numbers at times in Egypt; light infestation observed in Libya.

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Heteroptera

Lygaeidae (lygaeid bugs)

Macropes excavatus Dist. Sugarcane, other grasses. West Pakistan. Economic pest.

Spilostethus pandurus (Scop.). (See under Polyphagous Insects.)

Miridae (plant bugs)

Trigonotylus ruficornis (Geoffr.). Rice, other cereals. Afghanistan, Egypt, Europe. May occur in outbreak numbers.

See also following species under Polyphagous Insects:

Campylomma nicolasi Put. & Reut.

Lygus gemellatus (H.-S.)

Lygus rugulipennis Popp.

Stenodema (Stenodema) laevigatum (L.)

Taylorilygus pallidulus (Blanch.)

Trigonotylus brevipes Jak.

Pentatomidae (stink bugs)

Aelia acuminata (L.). Cereals. Libya, Morocco, Turkey, Iraq, Iran, Cyprus, Europe, European U.S.S.R. Some importance in U.S.S.R. and Iran; caused important losses in outbreaks in Europe.

Aelia albovittata Fieb. Cereals. Turkey.

Aelia cognata Fieb. Cereals. Turkey, Morocco.

Aelia furcula Fieb. Wheat. Iran.* Together with *A. virgata* caused heavy damage locally in Iran in 1958; up to 50-percent loss in Hamadan area.

Aelia melanota Fieb. Cereals. Afghanistan. Light infestations reported in 1961.

Aelia punctiventris Horv. Cereals. Egypt. Importance not known.

Aelia rostrata Boh. Wheat, grasses. Israel, Iran,* Iraq, Syria, Turkey,* Afghanistan (determined as possibly this species),* Spain, Europe into U.S.S.R., north Africa. Important on wheat in Spain; heavy infestations on pastures and very important on grain in Turkey, one generation per year, over 50,000 acres treated in 1962; no problem in Israel.

Aelia virgata Klug. Wheat. Iran,* Turkey. Caused heavy damage locally in Iran in 1958.

Eurygaster austriacus (Schr.). Cereals. Turkey, Europe, Morocco, other north African areas. Injurious to cereals. Important pest in north African areas.

Eurygaster integriceps Puton, senn pest, sunn pest, suni bug. Small grains principal hosts, sorghum, corn. Afghanistan,* Crete, Greece, Iran, Cyprus, Iraq, Israel, Jordan, Lebanon,* West Pakistan, Syria, Turkey,* U.S.S.R. (southern). One of most destructive pests of grain in Middle East; feeds on young stems and heads; may destroy entire wheat crop, often takes 25 percent or more of yield; also affects quality of flour and germination. (Fig. 7.)

Eurygaster maurus (L.). Cereals. Syria, Iran, West Pakistan, Morocco, Egypt, Europe. Severe damage in West Pakistan and Iran some years; occasionally important in parts of Europe.

Eurygaster testudinarius Geoffr. Cereal crops. Afghanistan.

Nezara graminea Fieb. Corn, millet, cotton. Pakistan, Iraq. Minor pest.

Nezara immaculata Freeman. Corn, wheat. Ethiopia.* Light populations in 1961.

Odontotarsus rufescens Fieb. Wheat. Lebanon,* Cyprus, Egypt.

Rhaphigaster nebulosa (Poda). Wheat, barley. Afghanistan,* Cyprus, Greece.

Schizops aegyptiaca (Lef.). Grasses. Afghanistan.* Importance unknown.

See also following species under Polyphagous Insects:

Agonoscelis pubescens Thunb.

Calidea dregii Germ.

Calidea nana (Hahn & H.-S.)

Carpocoris pudicus (Poda)

FIGURE 7.—*Eurygaster integriceps* adults.

Carpocoris purpureipennis (DeG.)

Dolycoris baccarum (L.)

Dolycoris penicillatus (Horv.)

Nezara viridula (L.)

Piezodorus lituratus (F.)

Rhopalidae (=Coreidae)

Liorhyssus hyalinus (F.). (See under Polyphagous Insects.)

Homoptera

Aleyrodidae (whiteflies)

Aleurolobus barodensis (Mask.), sugarcane whitefly. Sugarcane. West Pakistan, India. Major pest in West Pakistan.

Neomaskellia (Aleurodes) bergii (Sign.). Sugarcane. West Pakistan, India, east Asia. Major pest in West Pakistan and India.

Aphidae (aphids)

Acyrthosiphon (Metopolophium) dirhodum (Wlk.), (formerly in genus *Macrosiphum*). Wheat, barley, Rosaceae. Lebanon, Israel, Europe, central Asia. Not important.

Anoecia willcocksi Theob. Grasses (roots). Egypt, Israel.

Asiphonella cynodonti (Das). Bermudagrass (*Cynodon dactylon*). Ethiopia.

Asiphonella dactylonii Theob. Bermudagrass (roots and lower stem). Egypt.

Cuernavaca (Cavahyalopterus) noxius (Mordv.). Wheat, grasses. Afghanistan,* Iran, Libya,* Israel, Turkey, central Asia, parts of Europe and Africa. Damaging to wheat in Iran; outbreak in Turkey in 1961–62.

Forda formicaria Heyden. Pistachio, grains, grasses. Mediterranean region, Europe. Lives on roots of grasses in winter, on leaves of pistachio producing galls.

Forda marginata Koch. Wheat roots. Iran (determined as possibly this species).* Light infestation observed.

Geoica lucifuga (Zhnt.). Cereals, other grasses, Cyperaceae, Solanaceae. Somalia, Egypt, east Africa, Rhodesia, Israel, other areas of Asia. Attacks roots, injures young plants.

Hemitrama bykovi Mordv. Wheat. Turkey. Infests roots.

Longiunguis sacchari (Zhnt.) (=*A. sorghi* Theob.). Sugarcane, sorghum. Israel, Aden, West Pakistan, Egypt, Sudan,* Ethiopia,*

other parts of Africa, widely distributed. Minor pest in West Pakistan; sometimes injurious in Sudan; heavy infestations observed in Ethiopia.

Macrosiphum avenae (F.) (=*Macrosiphum granarium* (Kirby)), English grain aphid. Wheat, rice, other grasses. Pakistan, Afghanistan,* Iran,* Libya,* Egypt, Tunisia, Turkey, Israel, Europe, much of Asia, widespread. Heavy infestation in southern Iran in 1958; major pest on wheat in Pakistan; some importance in Libya.

Pemphigella paglianoi Gaum. Barley. Tunisia. Severe damage to roots.

Rhopalosiphum maidis (Fitch), corn leaf aphid. Corn, barley, wheat, sorghum. Egypt, Aden, Ethiopia,* Somalia, Iran,* Libya,* Lebanon, Syria, Israel, Turkey, Iraq, Pakistan, Jordan, Sudan, cosmopolitan. Serious pest in recent years in Egypt; very injurious in Turkey and Syria; one report indicates controls rarely necessary in Near East.

Rhopalosiphum padi (L.). Wheat, other grasses, some other plants. Libya,* Egypt, Israel, Jordan, Pakistan, cosmopolitan. Heavy infestations in Libya; minor pest in Pakistan.

Rhopalosiphum rufiabdomnalis (Sasaki), rice root aphid. Rice, barley, other Gramineae, *Prunus* sp., many other plants. Egypt, Israel, Jordan, Turkey, other areas of Asia and Africa, widespread. Some damage to barley in Turkey.

Schizaphis graminum (Rond.), greenbug (formerly in genus *Toxoptera*). Wheat, other grasses, *Cyperus* sp. Iran,* Iraq,* West Pakistan, Libya,* Egypt, Lebanon, Ethiopia, Israel, Turkey, widespread in many parts of world. Serious injury not reported in Middle East or Mediterranean area.

Sipha agropyrella H. R. L. Wheat. Afghanistan.*

Sipha maydis Pass. Corn, wheat, other grasses. Israel, Lebanon, Turkey, Europe, central Asia. Infests base of leaves, but does not cause heavy damage.

Cercopidae (spittlebugs)

Cercopis sanguninolenta Scop. ***intermedia*** (Kirschbaum). Wheat. Jordan. Heavy outbreak in Jordan in 1956.

Locris sp. Grasses. Ethiopia.* Light populations observed.

Philaenus sp., perhaps ***campestris*** Fall. Legume-grain mixture. Lebanon.* Common in some fields.

Cicadellidae (leafhoppers)

Cicadella spectra Dist. Sugarcane, rice. West Pakistan, east Asia, parts of Africa. Minor pest in West Pakistan.

Cicadella viridis (L.). Grasses. Iran.* No economic data.

Erythroneura coacta Ribaut. Corn. Israel, Cyprus. Feeds on leaves.

Zyginidia sp. near ***sohrab*** (Zakh.). Corn. Lebanon.* Observed causing heavy damage to corn.

Delphacidae (delphacid planthoppers)

Peregrinus maidis (Ashm.), corn planthopper. Sorghum, corn. Ethiopia,* Tanganyika. Heavy infestations found in Ethiopia under leaf sheaths. Virus vector in some areas of occurrence.

Sogata distincta Dist. Rice. West Pakistan. Major pest in Sind area, causing as much as 6-percent loss.

Derbidae

Proutista moesta (Westw.). Sugarcane. West Pakistan, east Asia. Minor pest in West Pakistan.

Diaspididae (armored scales)

Aspidiotus glomeratus Green. Sugarcane. West Pakistan. Minor pest.

Chortinaspis salavatiani Bal. & Kaus. Grasses. Iran.

Duplachionaspis divergens Green. Sugarcane. West Pakistan. Minor pest.

Odonaspis ruthae Kot. Bermudagrass. Egypt, other areas in Africa. Occurs beneath leaf sheaths and on rootstocks.

Odonaspis saccharicaulis Zhnt. Sugarcane. West Pakistan, India. Minor pest.

Lophopidae

Pyrilla aberrans (Kirby). Sugarcane, wheat, other grasses. Pakistan, Afghanistan, India. Major pest in Pakistan, attacks leaves.

Pyrilla perpusilla (Wlk.), sugarcane pyrilla. Sugarcane, wheat, other grasses. Afghanistan, Pakistan, India. Up to four generations per year. Attacks leaves. Common in Afghanistan; one of most destructive sugarcane pests in West Pakistan.

Pyrilla pusana Dist. (Some authors consider *pusana* apparently form of *perpusilla*.) Sugarcane, sorghum. Pakistan, India. Major pest in Pakistan.

Margarodidae (margarodid scales)

Margarodes aureliana Hall. Bermudagrass (*Cynodon dactylon*). Sudan. Serious damage to grass lawns.

Porphyrophora polonica (L.). Wheat, barley, other plants. Syria, other Mediterranean areas. Serious injury to wheat reported from Syria.

Porphyrophora tritici (Bod.). (H. M. Morrison, U.S. Dept. Agr., identified specimens from Iran as *Porphyrophora tritici*(?) (Bod.).) Wheat roots. Iran, Turkey. Severe damage in local area of Iran in 1961; infestations cause stunting and loss of yield.

Pseudococcidae (mealybugs)

Antonina graminis (Mask.) (=*indica* Green). Sugarcane. West Pakistan. Minor pest on sugarcane in West Pakistan.

Pseudococcus brevipes (Ckll.). (See under Polyphagous Insects.)

Pseudococcus saccharicola Takah. Sugarcane. West Pakistan, India. Minor pest.

Ripersia internodii Hall. Corn, sugarcane. Egypt. Attacks roots.

Ripersia sacchari Green. Sugarcane, rice. West Pakistan, Burma, India. Minor pest.

Trionymus masrensis Hall. Barley roots. Egypt.

Trionymus sacchari (Ckll.), pink sugarcane mealybug, sugarcane bug. Sugarcane, sorghum, other grasses. Egypt, Somalia, other areas of Africa, Asia including Israel, widely distributed. One of principal pests of sugarcane in Egypt; serious in some other areas.

Lepidoptera

Arctiidae (tiger moths)

See following species under Polyphagous Insects:

Amsacta lactinea (Cram.)

Amsacta moorei (Butl.)

Diacrisia investigatorum (Karsch)

Diacrisia obliqua (Wlk.)

Cosmopterygidae

Pyroderces simplex Wlsm. (See under Cotton Insects.)

Crambidae (grass moths)

Argyria sticticraspis Hmpsn., early shoot borer, yellow top borer. Sugarcane, millet. Pakistan, Afghanistan,* east Asia. Serious infestation in Pakistan in 1957, but generally rated as a minor pest; 10- to 15-percent damage in Afghanistan.

Bissetia steniellus (Hmpsn.), (formerly recorded as *Chilo trypetes* Bisset). Sugarcane. Pakistan, India, southeast Asia. One of important stalk borers of West Pakistan.

Chilo suppressalis (Wlk.) (=*simplex* (Butler) and *oryzae* (Fletcher)), Asiatic rice borer, rice stem borer. Rice, sorghum, corn, other grasses. Most of Asia (Pakistan, Iraq, Israel), Egypt, Nyasaland, Spain, Portugal. Serious pest of rice in Orient; causes heavy damage to corn and sorghum in India, Iraq, other areas; becoming conspicuous in corn in Israel.

Chilo tumidicostalis (Hmpsn.) (=*Argyria tumidicostalis* Hmpsn.). Sugarcane. Pakistan, India, Burma.

Chilo zonellus (Swinh.), maize and jowar borer. Corn, sorghum preferred, sugarcane, other grasses. Pakistan,* Afghanistan, India, Tanganyika, Kenya, Nyasaland, Sudan.* Most destructive pest of corn and sorghum in India, Pakistan, Kenya; minor pest on sugarcane in Pakistan. (Fig. 8.)

FIGURE 8.—*Chilo zonellus* damage to sorghum. Note pupae.

Proceras indicus Kapur, internodal borer. Sugarcane. Pakistan, India. Minor pest.

Proceras sacchariphagus Bojer, spotted borer, striped stalk borer. Rice, sugarcane. Pakistan, Malagasy Republic, Mauritius. Minor pest.

Eupterotidae

Nizaga simplex Wlk. Rice. West Pakistan. Minor pest.

Gelechiidae (gelechiid moths)

Brachmia insulsa Meyr. Corn, millet. West Pakistan. Minor pest.

Geometridae (geometrid moths)

Zamacra flabellaria Heegar. Grasses, legumes, ornamentals. Tunisia. Damaging to flowers and fruit.

Hesperiidae (skippers)

Gegenes nostradamus (F.). Sorghum. Libya.

Pelopidas mathias (F.), rice skipper. Rice, sugarcane, other grasses. Somalia, West Pakistan, India, Lebanon, Cyprus, Sudan, Egypt. Attacks leaves, can cause severe damage.

Pelopidas thrax (Hbn.). Sugarcane, rice, other grasses. Egypt, Somalia, tropical Africa, west Asia. Sometimes destructive.

Lymantriidae (tussock moths)

Dasychira pennatula (F.). Sugarcane, rice. West Pakistan, east Asia. Minor pest.

Porthesia xanthorrhoea (Koll.). (See under Cotton Insects.)

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Apamea sordens (Hufn.). Wheat, sometimes rye, oats, corn. Iran, U.S.S.R. Larvae attack heads and feed on grains. Severe pest in Iran and U.S.S.R.

Athetis clavipalpis (Scop.). Small grains. Iraq. Sometimes destructive.

Busseola fusca (Fuller), maize stalk borer. Corn, sorghum, other grasses. Widespread in Africa south of Sahara including Ethiopia,* Tanganyika, Kenya, Uganda. Most important pest of corn in Africa;

10-percent annual loss in southern Africa; 85- to 90-percent damage in areas of Kenya, Nyasaland, Ethiopia. (Fig. 9.)

Eublemma gayneri (Roths.). Sorghum. Ethiopia.

Leucania loreyi (Dup.). Corn, sorghum, other grasses. Iran,* Pakistan, Iraq, Cyprus, Israel, India, Egypt, Tunisia, Somalia, Sudan, parts of Europe. Larvae bore into whorls. Apparently minor pest in Iraq, Pakistan, Egypt, Iran; important on corn in Somalia and Tunisia.

Mesapamea secalis (L.). Cereals. Turkey. Reported as pest.

Oria musculosa (Hbn.). Wheat, other grasses. Iraq. May not be important.

Pseudaletia sp. (U.S. Dept. Agr. specialists believe reports of *P. unipuncta* (Haw.) from Asia involve other species.) Sugarcane, rice, small grains. Pakistan, Afghanistan,* Greece, Israel, wide areas of world. Major rice pest in Pakistan; outbreaks recorded in Afghanistan; rarely causes damage in Near East.

Sesamia cretica Led., durra stalk borer. Corn, broomcorn, sugarcane, sorghum, other grasses. Algeria, Sudan, Egypt, Ethiopia, Libya,* Somalia, Tunisia,* Iraq, Turkey, Morocco, Aden, Iran,* Syria, Saudi Arabia, Israel, Jordan, southern Europe. Important pest of corn, broomcorn, sorghum, sugarcane. Overwinters in plant debris as larva; adults emerge in May in Turkey; larvae feed in ears and stalks; three generations per year in Israel. As high as 10-percent average damage in Turkey; 90-percent infestations reported from other Mediterranean areas; damaging in Sudan; rated most important pest of sugarcane, corn, sorghum some years in Iran. (Fig. 10.)

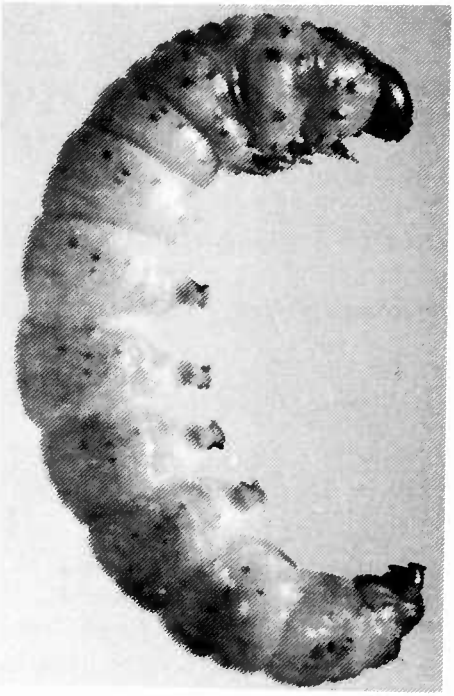

FIGURE 9.—*Busseola fusca* larva.

FIGURE 10.—*Sesamia cretica* larva and damage in corn.

Sesamia epunctifera Hmpsn. Barley, wheat. Ethiopia, Nyasaland, Tanganyika. Injurious to wheat.

Sesamia inferens (Wlk.). Sugarcane, corn, rice, other grasses. Pakistan, India, eastern Asia. Major pest in some areas, especially West Pakistan.

Sesamia uniformis (Dudgn.). Sugarcane, corn, wheat. West Pakistan, India. Major pest in West Pakistan.

Spodoptera abyssinia Gn. Rice, sugarcane. Iraq, Pakistan. Minor pest.

Spodoptera exempta (Wlk.), nutgrass armyworm, common armyworm. Cereals, pastures, other grasses preferred; rarely attacks cotton. Egypt, Ethiopia,* Sudan, other areas of Africa, Aden, southeast Asia. One of most important pests of grasses in Africa; devastating outbreak occurs periodically; teff (*Eragrostis abyssinica*) severely damaged some years in Ethiopia; outbreaks usually follow periods of high temperature and heavy rainfall.

Spodoptera mauritia (Bdv.), paddy cutworm. Rice, other grasses. Iran, West Pakistan to Australia, east Africa. Major pest in West Pakistan; damaging outbreaks in other areas.

See also following species under Polyphagous Insects:

Agrotis flammatra (Denis & Schiff.)

Agrotis ipsilon (Hfn.)

Agrotis pronuba (L.)

Chrysodeixis chalcites (Esp.)

Eublemma brachygonia Hmpsn.

Euxoa conspicua (Hbn.)

Euxoa segetum (Denis & Schiff.)

Euxoa spinifera (Hbn.)

Feltia exclamationis (L.)

Heliothis armigera (Hbn.). (Fig. 11.)

Heliothis dipsacea (L.)

Heliothis peltigera (Denis & Schiff.)

Spodoptera exigua (Hbn.)

Olethreutidae (olethreutid moths)

Cryptophlebia leucotreta (Meyr.). (See under Polyphagous Insects.)

Phycitidae

Anerastia ablutellus Zell. Sugarcane. West Pakistan, India. Minor pest on young cane.

FIGURE 11.—*Heliothis* larva in corn ear.

Cryptoblabes gnidiella (Mill.). (See under Polyphagous Insects.)

Emmalocera depressella (Swinh.), root borer. Sugarcane. Pakistan, Afghanistan,* India. Most destructive pest of underground parts of sugarcane in Pakistan and India. Major importance.

Pieridae (whites, sulfur butterflies)

Pieris brassicae nepalensis Dbl. Sugarcane. West Pakistan. Important pest.

Pyraustidae (pyraustid moths)

Nymphula depunctalis (Gn.). Rice. Pakistan, India. Minor pest in Pakistan.

Ostrinia nubilalis (Hbn.). (See under Polyphagous Insects.)

Psara licarsisalis (Wlk.). Grasses (roots). Iraq, Egypt.

Schoenobiidae

Scirpophaga nivella (F.), sugarcane top borer. Sugarcane. Pakistan, India, east Asia. Major pest in West Pakistan and India.

Tryporyza incertulus (Wlk.) (=*Schoenobius incertellus* (Wlk.) before 1934, *S. bipunctifera* (Wlk.)), rice stem borer, paddy stem borer, yellow stem borer. Rice. Afghanistan, Pakistan, India, Egypt, eastern Asia. Four to five broods per year. Serious infestations, up to 90-percent loss in Pakistan; 30-percent infestation in Afghanistan.

Scythrididae

Syringopais (Scythris) temperatella (Led.), cereal leaf miner. Wheat, barley, oats preferred, many additional hosts recorded. Cyprus, Turkey,* Lebanon, Syria, Jordan, Iraq,* Israel, Iran.* Larvae mine leaves from November to April, may kill entire plantings. As many as 60–90 larvae per plant reported in Iran. Major pest of cereals in Middle East; annual loss in Jordan 15–20 percent; 20–25 percent in Turkey; severe losses reported from other areas. (Fig. 12.)

Coleoptera

Carabidae (ground beetles)

Zabrus femoratus Dej. Cereals. Turkey. *Zabrus* spp. most damaging beetles on grain in Turkey.

Zabrus incarnatus Cor. Cereals. Turkey.

Zabrus morio Men. Cereals. Turkey, Iran. Larvae feed on young plants, adults on flowers and young grain. Injurious in Iran.

Zabrus tenebrioides (Goeze), corn ground beetle. Small grains most important cultivated hosts, corn, beets. Turkey, Iran, parts of Europe. Adults feed on developing heads, larvae on roots and leaves. Serious losses on thousands of acres of small grains reported in Ukraine, Yugoslavia, Turkey.

Chrysomelidae (leaf beetles)

Aphthona latipennis Pic. (See under Polyphagous Insects.)

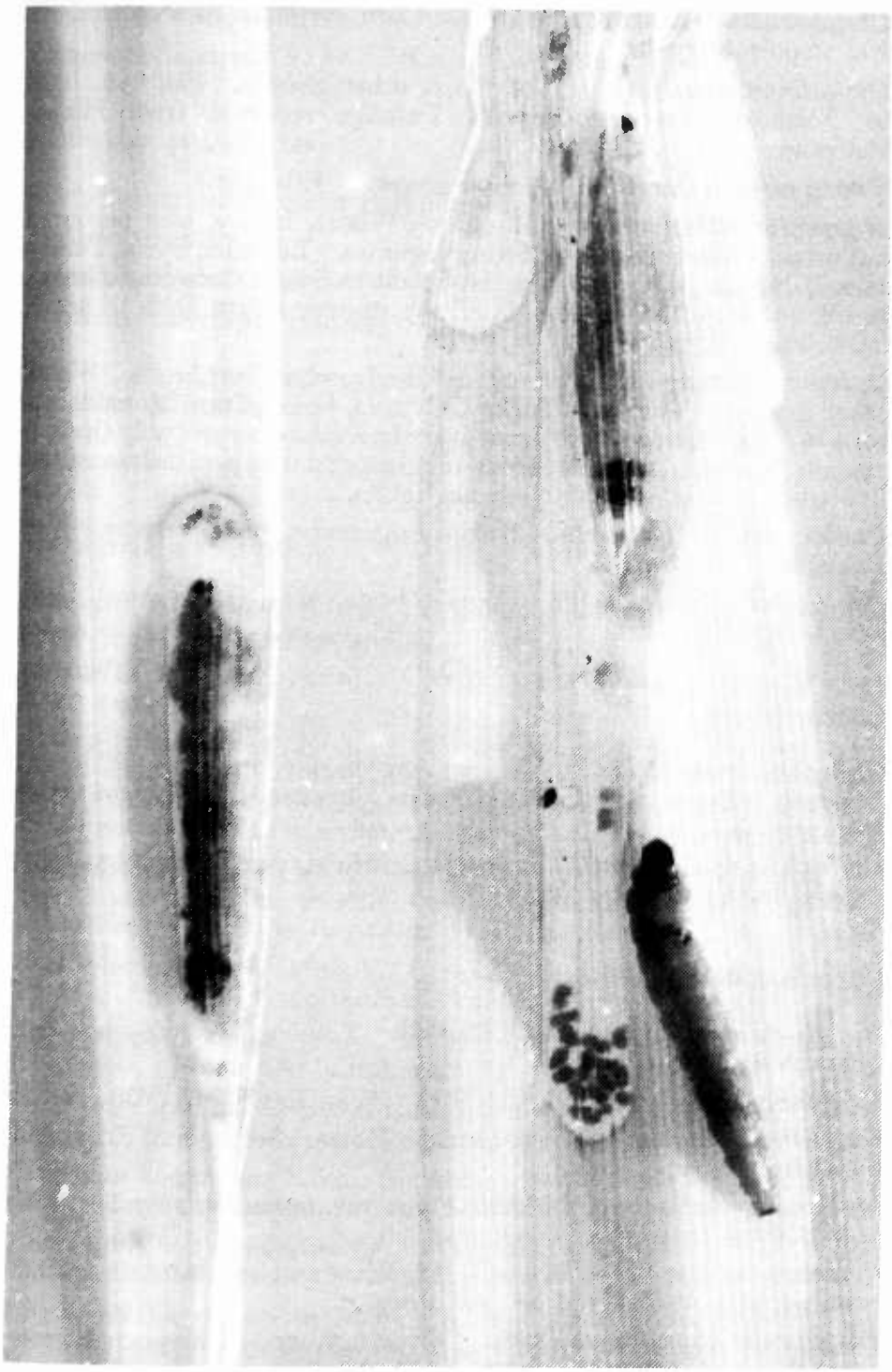

FIGURE 12.—*Syringopais temperatella* damage to wheat. Note larvae in mines.

Chaetocnema chlorophana Duft. Corn, sorghum. Lebanon, Syria. Not important pest.

Dicladispa armigera (Ol.). Rice, other grasses. Pakistan, India to Formosa. Damages leaves. Damage reported from Punjab, Pakistan.

Exora pusilla Gerst. Teff, other grasses. Ethiopia.†

Marseulia dilativentris (Reiche). Wheat, barley, oats preferred, but attacks other plants including legumes. Lebanon, Syria, Turkey, Israel, Jordan. Occasionally important in Syria, skeletonizes leaves; in hills of Israel when abundant may destroy entire fields of grain; most damage by adults.

Oulema melanopa (L.), cereal leaf beetle, wheat leaf beetle. Wheat, other grasses. Tunisia,* Turkey, Cyprus, Israel, Iran, Morocco, Europe to Siberia (specimens from Iran determined as probably this species).* Serious damage in areas of Europe; minor pest in Iran; scarce in Mediterranean areas, damage negligible.

Pachnephorus bistriatus Muls. Sugarcane, okra, sesame. West Pakistan. Minor pest.

Psylliodes elliptica Alld. Cereals, beets. Jordan, Turkey. Damages leaves and stems.

Coccinellidae (lady beetles)

Chnootriba similis (Thunb.). Corn, barley, grasses. Ethiopia,* Rhodesia. Feeds on leaves. Heavy infestations reported from Ethiopia.

Epilachna (Solanophila) vigintipunctata Muls. Wheat, corn, other grasses, some herbaceous plants. Ethiopia,* Kenya.

Curculionidae (weevils)

Barytychius avulsus Faust. Cereals. Tunisia. Larvae cause considerable damage to heads.

Echionocnemus oryzae Mshl. Rice. West Pakistan. Minor pest.

Lixus incurvinasus Csiki ***curvinasus*** Kolbe. Sorghum. Ethiopia,‡ east Africa, Egypt, Sudan.

Myllocerus undecimpustulatus Faust var. ***maculosus*** Desbr. (See under Cotton Insects.)

Perieges bardus Boh. Wheat. Afghanistan,‡ central Asia. Moderate population observed on field wheat.

Tanymecus abyssinicus Hust. Corn, sorghum. Ethiopia. Serious damage to seedlings in some areas.

See also following species under Polyphagous Insects:

Myllocerus undecimpustulatus Faust

Tanymecus dilaticollis Gyll.

Tanymecus indicus Faust

Tanymecus sparsus Fahr. (See under Cotton Insects.)

Elateridae (wireworms)

See following species under Polyphagous Insects:

Agriotes lineatus (L.)

Agriotes pilosus (Panz.)

Cardiphorus rufipes (Goeze)

Meloidae (blister beetles)

Lytta picta (Lap.). Corn, millet. West Pakistan. Minor pest.

Scarabaeidae (scarabs)

Adoretus rugulosus Burm. Sorghum, cotton. Sudan. Feeds on cotton roots, but prefers sorghum.

Anisoplia agricola (Poda). Cereals, other grasses. Iran, Turkey. Minor pest.

Anisoplia austriaca (Hbst.). Grasses, wheat. Iran, Turkey, Syria, eastern Europe, U.S.S.R. Adults feed on heads of grain from May to July, larvae on roots of many plants. *Anisoplia* spp. cause 10- to 15-percent damage to wheat and barley in Turkey; important in Iran.

Anisoplia leucaspis Lap. Cereals, other plants. Iran, Syria, Turkey. Larvae feed on roots and seedlings, adults on developing grain; 2-year life cycle. Most damaging scarab on cereals in Iran.

Anisoplia segetum (Hbst.). Cereals, other grasses, cotton. Iran, Turkey, U.S.S.R. Importance not known in Iran.

Heteronychus paolii Arrow. Sugarcane. Somalia, Pakistan. Attacks roots. Minor pest in Pakistan.

Heteronychus parumpunctatus Burm. Sugarcane, corn, cotton. Egypt. Attacks young stems and shoots.

Pentodon bispinosus Küst. Sugarcane, corn, cotton. Egypt. Some damage to young stems.

Phyllognathus dionysius (F.). Sugarcane, deciduous fruit. West Pakistan. Minor pest of fruit; major pest on sugarcane.

Phyllopertha nazarena Mars. Wheat, other winter cereals, some other plants. Israel, Syria, Jordan. Larvae injure roots, 25 percent in some fields; approximately 3-year life cycle in Israel; apparently adults do not feed.

See also following species under Polyphagous Insects:

Anomala egregia Gahan

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Anomala plebeja Ol.
Anoxia pilosa (F.)
Epicometis hirta Poda
Oxythyrea abigail Reiche & Saulcy
Oxythyrea cinctella (Schaum)
Oxythyrea pantherina (Gory & Perch.)
Pachnoda interrupta (Ol.)
Pentodon bispinifrons Reit.
Pentodon idiota (Hbst.)
Polyphylla olivieri (Lap.)
Tropinota squalida (Scop.)

Tenebrionidae (darkling beetles)

Gonocephalum simplex (F.). (See under Polyphagous Insects.)

Hymenoptera

Cephidae (stem sawflies)

Cephus pygmaeus (L.), European wheat stem sawfly. Wheat, barley, rye. Israel, Egypt, Iran, Syria, Turkey, Iraq, Morocco, Europe into U.S.S.R. Minor pest in Iran; damage usually slight in Mediterranean region.

Cephus tabidus (F.), black grain stem sawfly. Barley. Libya,* Egypt, Cyprus, Iran. Minor pest in Iran; some injury in Egypt.

Diptera

Agromyzidae (leaf miner flies)

Agromyza ambigua Fall. Barley, wheat. Libya, Iran, Israel, Egypt. Mines in leaves. Minor pest in Iran; not considered pest in Mediterranean area.

Pseudonapomyza atra (Meig.). Corn, wheat, barley. Egypt, Europe. Makes linear mines in leaves.

Anthomyiidae

Atherigona excisa Thoms. Sorghum, corn, other grasses. Israel, Tanganyika. Kills buds in young plants. Serious pest in Israel, as much as 90-percent infestation.

Atherigona indica Mall. Sorghum. Sudan, India, Kenya. Burrows in shoots. Important in southern India.

Hylemya coarctata Fall., wheat bulb fly. Winter wheat preferred, rye, barley, some wild grasses. Europe, Tunisia, Iraq. Kills stands by feeding in stems. Caused loss of 1.2-million pounds sterling on wheat in England in 1953.

Hylemya flavibasis Stein, cereal root maggot. Grains. Israel. Can cause serious damage; attacks plants in root area, causing dieback.

Bibionidae (march flies)

Bibio hortulanus (L.). (See under Polyphagous Insects.)

Cecidomyiidae (=Itonididae) (gall midges)

Contarinia sorghicola (Coq.), sorghum midge. Sorghum. Aden, Sudan, other areas of Africa. Important pest of sorghum. Infests heads. Damaging in Sudan.

Contarinia tritici (Kirby). Cereals. Turkey, Iran, Europe. Minor pest in Iran.

Pachydiplosis oryzae (Wood-Mason), rice stem gall midge. Rice, other grasses. Sudan (southern), Nigeria, Pakistan, southeast Asia. Considerable loss to rice in areas of Asia; serious infestations in India; major pest in Pakistan.

Phytophaga destructor (Say), hessian fly. Wheat. Tunisia, Cyprus, Iraq, Israel, Turkey, Algeria, Morocco, Europe. Major pest of wheat in Tunisia, some other areas of world.

Chloropidae (chloropid flies)

Meromyza saltatrix (L.). Wheat, other cereals. Iran, Europe. Larvae attack terminals and young heads. Minor to medium importance in Iran; damaging in Europe.

Oscinella frit (L.), frit fly, Swedish fly. Cereals. Turkey, Iran, Europe, U.S.S.R., rare in Egypt and Israel.

Ephydridae

Hydrella griseola (Fall.), rice leaf miner. Cereals. Turkey, Libya, Egypt, Cyprus, Europe, rare in Israel. Damaging to rice in Hungary; common in Egypt; severe damage not known in Mediterranean area.

Scatopsidae

Scatopse nigra Meig. Barley. Turkey. Infests grain heads.

Tipulidae (crane flies)

Tipula oleracea L. (See under Polyphagous Insects.)

INSECTS AFFECTING FORAGE LEGUMES

Principal crop species: Alfalfa (*Medicago sativa*), clover (*Trifolium* spp.), sweetclover (*Melilotus* spp.), vetch (*Vicia* spp.).

Acarina

Tetranychidae (spider mites)

Tetranychus atlanticus McG. (See under Polyphagous Insects.)

Collembola

Sminthuridae (springtails)

Deuterosminthurus repandus Agrin. Clover, grasses. Afghanistan.* Numerous in lawns.

Sminthurus viridis Lubb., lucerne-flea. Prefers legumes such as alfalfa and clover, attacks many other crops, especially seedling stage. Tunisia,* Israel, Iraq, Iran,* Libya, most of Europe. Occasionally damaging in Europe; damage not conspicuous in Mediterranean region.

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

Aiolopus thalassinus (F.). Alfalfa. Israel, Jordan, Cyprus, West Pakistan,* Egypt. Heavy population observed in alfalfa in West Pakistan.

Spathosternum prasiniferum (Wlk.). Alfalfa, grasses. West Pakistan.* Involved in heavy population of grasshoppers in fields in Karachi area in 1962.

Sphingonotus obscuratus lameerei Finot. Alfalfa, grasses. Libya.

Thisoicetrus annulosus (Wlk.). Alfalfa, grasses. Libya,* Egypt.

See also following species under Polyphagous Insects:

Aiolopus savigni (Kr.)

Aiolopus strepens (Latr.)

Anacridium aegyptium (L.)

Arcyptera labiata (Brullé)

Calliptamus barbarus Costa

Calliptamus italicus (L.)

Eyprepocnemis plorans (Charp.)

Oedaleus decorus (Germ.)

Oedaleus senegalensis (Kr.)

Oedipoda caerulescens (L.)

Schistocerca gregaria (Forsk.)

Thisoicetrinus pterostichus (F. W.)

Pyrgomorphidae

Atractomorpha acutipennis brevis Uv. Alfalfa, grasses. West Pakistan.* Involved in heavy grasshopper populations in fields in Karachi area in 1962.

Tettigoniidae (longhorn grasshoppers)

Conocephalus maculatum (LeG.). Alfalfa, grasses. West Pakistan.* Light population observed.

See also following species under Polyphagous Insects:

Decticus annaelisae Ramme

Tettigonia caudata (Charp.)

Thysanoptera

Thripidae (thrips)

See following species under Cotton Insects:

Caliothrips impurus (Pries.)

Caliothrips sudanensis (Bagn. & Cam.)

See following species under Polyphagous Insects:

Frankliniella intonsa (Tryb.)

Thrips angusticeps (Uzel)

Heteroptera

Miridae (plant bugs)

Adelphocoris lineolatus (Goeze), alfalfa plant bug. Alfalfa, other legumes. Afghanistan.* Light infestations observed in Afghanistan in 1961.

Calocoris norvegicus (Gmel.), potato capsid. Alfalfa, potato, beets, some other plants. Iran,* Egypt, Europe. Reported as common in alfalfa in areas of Iran in 1958.

See also following species under Polyphagous Insects:

Creontiades pallidus (Ramb.)

Helopeltis schoutedeni Reut.

Lygus gemellatus (H.-S.)
Lygus pratensis (L.)
Lygus rugulipennis Popp.
Stenodema (Stenodema) laevigatum (L.)
Taylorilygus pallidulus (Blanch.)
Trigonotylus brevipes Jak.

Pentatomidae (stink bugs)

Adria parvula (Dall.). Alfalfa-grass mixture. West Pakistan.*

Piezodorus rubrofasciatus (F.). Alfalfa-grass mixture. West Pakistan.* Light populations observed in Karachi area.

See also following species under Polyphagous Insects:

Calidea duodecimpunctata (F.)
Dolycoris penicillatus (Horv.)
Eusacoris inconspicuus (H.-S.)
Nezara viridula (L.)

Pyrrhocoridae (pyrrhocorid bugs)

Pyrrhocoris apterus (L.). Alfalfa, other plants. Turkey,* Afghanistan,* Spain. Species sometimes predaceous. Heavy populations in Turkey.

Rhopalidae (=Coreidae)

Corizus hyoscyami (L.). Alfalfa. Iran,* Egypt. Not common in Egypt.

Liorhyssus hyalinus (F.). (See under Polyphagous Insects.)

Homoptera

Aphidae (aphids)

Acyrthosiphon pisum (Harr.), pea aphid, (formerly in genus *Macrosiphum*). Alfalfa, peas, other legumes. Lebanon,* Syria, Iran, Iraq, Afghanistan, Libya,* Ethiopia, Egypt, Pakistan, Israel, Jordan, Turkey, cosmopolitan. Damage minor in Near East. Virus vector, injurious to various legume crops.

Anoecia corni (F.). *Trifolium* sp. Iran.* Minor pest.

Aphis craccivora Koch. Legumes (including beans), melons, some other hosts. Saudi Arabia, Egypt, Libya,* Jordan, Iraq, Israel, Afghanistan,* Pakistan, Syria, Lebanon,* Cyprus, Turkey, Ethiopia,* Somalia, Sudan,* cosmopolitan. Principally pest of legumes. Dam-

ages young growth, often severely; mainly in spring in Egypt and Israel; major pest in Pakistan in alfalfa.

Aphis medicaginis Koch, cowpea aphid. Alfalfa. Iran,* Afghanistan,* Libya,* Pakistan, Turkey. Serious on alfalfa in Afghanistan areas in 1958; minor pest in Pakistan.

Therioaphis luteola (Bnr.). Clover. Turkey.

Therioaphis maculata (Buckt.). Alfalfa preferred, also reported on other legumes. Sudan,* Iran,* Libya,* Morocco, Egypt, Ethiopia, Iraq, Cyprus, Pakistan, Afghanistan,* Turkey, Israel, India, Europe. Damaging outbreaks observed on improved varieties in Libya; medium infestations in Afghanistan; generally populations in Mediterranean countries reported to be light, but may have serious outbreaks.

Therioaphis riehmi (Bnr.), sweetclover aphid. Sweetclover. Iran,* Afghanistan,* Europe. Light populations in Afghanistan.

Therioaphis trifolii (Monell), yellow clover aphid. Red clover, other clovers. Iran, Turkey, Egypt, Europe.

Cicadellidae (leafhoppers)

Erythroneura asiatica Kusn. (See under Polyphagous Insects.)

Lepidoptera

Arctiidae (tiger moths)

Diacrisia investigatorum (Karsch). (See under Polyphagous Insects.)

Gelechiidae (gelechiid moths)

Anacampsis anthyllidella (Hbn.). Alfalfa. Libya.*

Dichomeris ianthes (Meyr.). Alfalfa, pigeonpea, some other legumes. Egypt, Pakistan, India, some other eastern areas. Minor pest.

Geometridae (geometrid moths)

Zamacra flabellaria Heegar. (See under Cereal Insects.)

Lasiocampidae (tent caterpillar moths)

Lasiocampa trifolii (Esp.). Forage crops. Libya, Tunisia, Israel. Minor pest.

Lycaenidae (blues, coppers, hairstreaks)

Chilades galba (Led.). Forage crops. Libya, Egypt. Minor pest.

Zizeeria lysimon (Hbn.). Alfalfa. Libya.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

See following species under Polyphagous Insects:

Autographa gamma (L.)

Heliothis dipsacea (L.)

Prodenia litura (F.)

Spodoptera exigua (Hbn.)

Xylena exoleta (L.). (See under Insects Affecting Edible Legumes.)

Pieridae (whites, sulfur butterflies)

Colias croceus (Fourc.) (=*edusa* F.), clouded yellow. Alfalfa, clover, other legumes. Lebanon, Syria, Israel, Jordan, Iraq, Cyprus, Turkey, Iran, Pakistan, Arabia, Egypt, Libya, Tunisia, east Africa, southern Africa, Europe. Minor pest in Iran, Pakistan, Egypt; injurious in southern Africa; not of serious economic importance in Near East.

Colias hyale marmoana (Rogenh.). Alfalfa. Sudan, Ethiopia, Somalia. Severe infestations in Sudan.

Pyraustidae (pyraustid moths)

Hedylepta indicata (F.). Forage legumes, peanut, beans, peas. Pakistan, Uganda. Minor pest.

Nomophila noctuella (Denis & Schiff.). Alfalfa, other plants. Arabia, Iran,* Cyprus, Iraq, Afghanistan, Egypt, Libya, widespread migrant. Minor pest on foliage in Iran.

Tortricidae (leaf roller moths)

Cnephasiella incertana (Tr.). Alfalfa. Israel, Europe. Webs terminals. Not rated as pest of importance.

Coleoptera

Bruchidae (seed beetles). (Bruchid records on forage legumes included under Insects Affecting Stored Products.)

Chrysomelidae (leaf beetles)

Phytodecta fornicatus Brüg., lucerne beetle. Alfalfa, black medic (*Medicago lupulina*). Middle Europe into Middle East including Turkey, Syria, Iraq. Larvae and adults cause damage in parts of Europe.

See also following species under Polyphagous Insects:

Aphthona fuentei Reit.

Aphthona latipennis Pic

Coccinellidae (lady beetles)

Subcoccinella vigintiquatuorpunctata (L). Clover, alfalfa, other legumes, beets. Turkey, southeastern Europe. Important on alfalfa in Yugoslavia; occasionally attacks beets.

Curculionidae (weevils)

Amblyrhinus poricollis Boh. Alfalfa. West Pakistan.† Light infestations observed in alfalfa.

Apion sp. Alfalfa. Iran.* Heavy infestations observed.

Apion aestivum Germ. (See under Polyphagous Insects.)

Apion arrogans Wenk. Legumes, especially broadbean and vetch. Israel, Turkey, Syria. Feeds on buds and flowers. Economic species.

Apion punctigerum Payk. Legumes. Lebanon. Not important.

Apion reflexum Gyll. Alfalfa. Tunisia.‡

Apion seniculus Kirby. Legumes. Israel. Economic in Israel.

Apion tenue Kirby. Alfalfa. Tunisia,‡ parts of Asia and Europe. Attacks tender stems. Some importance.

Hypera brunneipennis (Boh.). Berseem (*Trifolium alexandrium*), alfalfa. Egypt, Afghanistan.‡ Common but not damaging when observed in Afghanistan.

Hypera nigrirostris (F.). Alfalfa, clover. Tunisia,* Israel. Not causing economic damage when observed in Tunisia.

Hypera postica (Gyll.) (=*variabilis* (Hbst.)), alfalfa weevil. Alfalfa. Tunisia,* Libya,* Iran,* Iraq, Lebanon,* Israel, Saudi Arabia, Turkey,* Pakistan, Afghanistan,‡ Europe. Most serious pest of alfalfa in Iran; damaging in Libya; minor pest in Pakistan.

Hypera striatus (Boh.). Legumes including broadbean. Lebanon, Israel, Syria, parts of Europe. Not important in Lebanon; some importance in Israel.

Leptomias schonherri Faust. Alfalfa, honeysuckle, polyphagous. Afghanistan‡ to Manchuria. Commonly found in alfalfa, but apparently not causing damage.

Myllocerus discolor Boh. var. ***uniformis*** Mshl. Alfalfa. West Pakistan.† Light infestation observed in alfalfa.

Sitona sp. Alfalfa, broadbean. Iran.* Light infestations observed.

Sitona callosus Gyll. Alfalfa, sweetclover. Afghanistan,‡ Europe into Asia. Adults feed on foliage, larvae on roots. Heavy infestation noted in alfalfa, but economic damage not apparent.

Sitona concavirostris Hochh. Vetch. Lebanon.‡ Light infestation observed.

Sitona crinitus (Hbst.). Vetch, clover, alfalfa. Israel, Syria, Turkey, U.S.S.R. (Caucasus). Defoliation reported from Israel.

Sitona cylindricollis Fahr., sweetclover weevil. Alfalfa. Afghanistan,* Iran, Israel. Abundant and damaging in Iran in 1958, but generally minor pest; medium populations observed in Afghanistan.

Sitona gressoria (F.). Lupine. Israel, Germany, southern Europe. Severe pest at times in Portugal.

Sitona griseus (F.). Lupine, alfalfa, beans. Libya, Europe. Severe pest at times in Portugal.

Sitona hispidula (F.). Clover, alfalfa, vetch. Israel. One of most prevalent species of *Sitona* in Israel.

Sitona humeralis Steph. Alfalfa, clover, other legumes. Iran,* Europe, central Asia, Tunisia.‡ Adults feed on foliage, larvae on roots. Heavy infestations in Iran.

Sitona inops Schönh. Vetch, alfalfa. Lebanon,‡ Europe. Adults feed on leaves, larvae on roots. Light infestations observed on vetch in Lebanon.

Sitona limosus Rossi. Alfalfa, broadbean, clover. Tunisia, Algeria, Cyprus, Israel, Italy, Greece. Light infestations observed in Tunisia. Rated as minor pest.

Sitona lividipes Fahr. Clover, alfalfa. Israel. One of most prevalent species of *Sitona* in Israel.

Tychius sp. Alfalfa. Turkey,* Iran.* Heavy infestations observed in Turkey.

Meloidae (blister beetles)

Epicauta erythrocephala Pall. (See under Polyphagous Insects.)

Scarabaeidae (scarabs)

Anoxia pilosa (F.). (See under Polyphagous Insects.)

Diptera

Agromyzidae (leaf miner flies)

Agromyza nana Meig. Berseem, other legumes. Egypt, Europe. Some importance in Europe.

Cecidomyiidae (=Itonidae) (gall midges)

Perrisia viciae Kief., vetch gall midge. Vetch, alfalfa, other legumes. Israel, Europe. Folds leaves, some economic importance on young leaves.

Tipulidae (crane flies)

Tipula oleracea L. (See under Polyphagous Insects.)

COTTON INSECTS

Principal crop species: Cotton (*Gossypium* spp.), kenaf (*Hibiscus cannabinus*), okra (*H. esculentus*).

Acarina

Eriophyidae (eriophyid mites)

Aceria gossypii (Banks), cotton blister mite. Cotton. West Pakistan. Minor pest in West Pakistan.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus obovatus Donn. (See under Polyphagous Insects.)

Tetranychidae (spider mites)

Oligonychus coffeae (Nietn.). Cotton, eucalyptus, tea. Egypt, Ethiopia,* other areas of Africa, U.S.S.R. (Transcaucasia), east Asia. Heavy infestations on eucalyptus in Ethiopia.

Oligonychus mangiferus (Rahman & Sapra) (=*O. terminalis* Sayed). Mango, cotton. Egypt.* Apparently of some importance in Egypt on mango; minor pest on cotton.

See also following species under Polyphagous Insects:

Tetranychus atlanticus McG.

Tetranychus cinnabarinus (Bdv.)

Tetranychus telarius (L.)

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

Acrida bicolor (Thunb.). Cotton. Pakistan, Cyprus, Jordan, Israel, Turkey, Syria, Tunisia, Egypt, Somalia, Ethiopia, other areas of Africa, parts of Europe. Minor pest of cotton in Pakistan.

Acrida exaltata (Wlk.). Cotton. Pakistan, India, Iran, Afghanistan, southern Arabia. Minor pest on cotton some areas.

Cataloipus abyssinicus Uv. Cotton (leaf). Sudan.

Catantops axillaris saucius (Burm.). Cotton. Sudan. Feeds on leaves.

Pyrgomorpha cognata Kr. Cotton, vegetables, other plants. Sudan, Egypt, southern Arabia. Occasionally damages margins of cotton-fields.

Pyrgomorpha conica (Ol.). Cotton. Sudan, Egypt, Israel, U.S.S.R. (Transcaucasia), Cyprus. Feeds on leaves of cotton.

See also following species under Polyphagous Insects:

Acrotylus insubricus (Scop.)
Aiolopus strepens (Latr.)
Anacridium aegyptium (L.)
Anacridium moestum melanorhodon (Wlk.)
Calliptamus italicus (L.)
Calliptamus turanicus Tarb.
Catantops somalicus Sjöst.
Chrotogonus homalodemus (Blanch.)
Chrotogonus trachypterus robertsi Kirby
Chrotogonus trachypterus trachypterus (Blanch.)
Cyrtacanthacris tatarica (L.)
Dociostaurus kraussi (Ingen.)
Dociostaurus maroccanus Thunb.
Eyprepocnemis noxia Dirsh
Eyprepocnemis plorans (Charp.)
Kraussaria angulifera (Kr.)
Locusta migratoria migratorioides (R. & F.)
Nomadacris septemfasciata Serv.
Oedaleus decorus (Germ.)
Oedaleus senegalensis (Kr.)
Oedipoda caerulescens (L.)
Oedipoda miniata (Pall.)
Oxya velox (F.)
Poekilocerus pictus (F.)
Sphingoderus carinatus (Sauss.)
Thisoicetrinus pterostichus (F. W.)
Thisoicetrus littoralis (Ramb.)
Truxalis nasuta (L.)
Zonocerus variegatus (L.)

Gryllidae (crickets)

Acheta viator (Kirby). Mango, cotton. West Pakistan, India. Major pest on cotton; minor pest on mango.

Scapsipedus felderi Sauss. Cotton. Sudan. Attacks seedlings.

Scapsipedus marginatus (Afz. & Brann.). Cotton. Somalia, Ethiopia, Sudan. Economic damage to seedlings.

See also following species under Polyphagous Insects:

Acheta domesticus (L.)

Gryllus bimaculatus DeG.

Gryllus campestris L.

Oecanthus pellucens (Scop.)

Tartarogryllus burdigalensis (Latr.)

Gryllotalpidae (mole crickets)

See following species under Polyphagous Insects:

Gryllotalpa africana P. de B.

Gryllotalpa gryllotalpa (L.)

Gryllotalpa unispina Sauss.

Tettigoniidae (longhorn grasshoppers)

See following species under Polyphagous Insects:

Decticus albifrons (F.)

Decticus annaelisae Ramme

Tettigonia caudata (Charp.)

Tettigonia viridissima (L.)

Isoptera

Rhinotermitidae (termites)

Coptotermes spp. Cotton. Somalia, Ethiopia. Injure roots.

Coptotermes sjostedti var. ***subintacta*** Silv. Cotton. Somalia.

Termitidae (termites)

Microtermes sp. Cotton. Yemen.* Very heavy infestation reported on roots and stems.

Microtermes aluco (Sjöst.). Cotton. Sudan.* Infests roots and stems.

Microtermes obesi Holmgr. (See under Polyphagous Insects.)

Microtermes thoracalis Sjöst. Cotton. Sudan. Causes serious local damage by feeding in roots and stems.

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips dolichothripoides Bagn. Cotton (seedling). Sudan.

Thripidae (thrips)

Caliothrips impurus (Pries.) (=*fumipennis* (Bagn. & Cam.)). Cotton, alfalfa, vegetables, other crops and plants. Sudan, Ethiopia. On cotton requires control in Sudan, where it causes severe damage, up to 50 percent on 2,000 acres in one area in 1962; also damages *Dolichos lablab*.

Caliothrips sudanensis (Bagn. & Cam.). Cotton, alfalfa, vegetables, other crops and plants. Sudan, Ethiopia. On cotton not so injurious as *C. impurus*, but causes important damage.

Dendrothrips russoi Pries. Cotton. Somalia.

Frankliniella dampfi Pries., cotton bud thrips. Cotton, cereals, many other plants. Egypt, Somalia, Sudan. Some damage to cotton in Gezira, Sudan; infests heads of cereals.

Scirtothrips mangiferae Pries. Peach, cotton. Libya, Egypt, Sudan. Attacks cotton buds.

Taeniothrips sjostedti (Tryb.). Cotton (flower). Somalia, Nigeria.

Thrips flavus Schrank. Cotton. Iran, Turkey, U.S.S.R. (Transcaucasia, Turkestan). Important on young cotton in Iran.

See also following species under Polyphagous Insects:

Retithrips syriacus (Mayet)

Scirtothrips dorsalis Hood

Thrips tabaci Lind.

Heteroptera

Coreidae (coreid bugs)

Anoplocnemis curvipes F. (See under Polyphagous Insects.)

Leptocoris griseiventris Stål. Cotton. Somalia.

Lygaeidae (lygaeid bugs)

Graptostethus servus (F.). Cotton, jute. Egypt, Somalia, Sudan, east Africa, southern and eastern Asia including Pakistan. Attacks green boll of cotton. Minor pest on jute in Pakistan.

Lygaeus furcatus F. Cotton (leaf and boll). Somalia, Sudan, Kenya, Tanganyika.

Lygaeus hospes F. Cotton. West Pakistan. Minor pest on green bolls.

Lygaeus (Spilostethus) longulus (Dall.). Cottoon, beans. Libya, Egypt, Sudan. Importance apparently undetermined.

Oxycarenus fieberi Stål. Cotton, other Malvaceae. Sudan, Uganda. Attacks ripe seed. *Oxycarenus* spp. may reduce seed weight as much as 2–15 percent and affect germination.

Oxycarenus hyalinipennis (Costa), cottonseed bug. Cotton, okra, hollyhock, other Malvaceae. Sudan,* Ethiopia,* Somalia, Egypt, Tunisia, many other African countries, Cyprus, Turkey, Iraq, Iran, Syria, Greece, India, Pakistan, southeast Asia, Aden. Attacks cottonseed as bolls open causing weight loss of seed and stained lint. Major pest in Pakistan and Iran.

Oxycarenus lavaterae (Fieb.). Cotton, peach. Tunisia, Algeria, Morocco, Ethiopia (determined as possibly this species).* Damages open bolls of cotton.

Oxycarenus rufiventris (Germ.). Cotton (open boll). Sudan, Uganda.

Spilostethus pandurus (Scop.). (See under Polyphagous Insects.)

Miridae (plant bugs)

Orthops kalmii (L.). Cotton. Turkey. Infests cotton.

Phytocoris obscuratus Reut. Cotton. Turkey. Found infesting cotton.

Ragmus flavomaculatus Ball. Cotton. West Pakistan. Minor pest.

Ragmus importunitas Dist. Cotton, sunn hemp. West Pakistan. Minor pest.

Ragmus morosus Ball. Cotton. West Pakistan. Minor pest.

Taylorilygus vosseleri (Popp.). Cotton. Sudan, east Africa, Congo. Attacks bud, boll, leaf, square causing distortion and boll drop. Serious pest on occasion.

See also following species under Polyphagous Insects:

Campylomma diversicornis Reut.

Campylomma nicolasi Put. & Reut.

Creontiades pallidus (Ramb.)

Helopeltis schoutedeni Reut.

Lygus pratensis (L.)

Stenodema (Stenodema) laevigatum (L.)

Pentatomidae (stink bugs)

Acrosternum (Nezara) acuta Dall. Cotton. Somalia, Congo. Attacks green bolls. Important vector of boll disease in Congo.

Acrosternum (Nezara) pallidoconspersum (Stål). Cotton, castorbean. Somalia, Ethiopia, Uganda. Attacks green bolls of cotton.

Atelocera raptoria Germ. Cotton. Sudan, Nigeria, Uganda. Attacks green boll.

Macrorhaphis acuta Dall. Cotton. Sudan.* Economic importance unknown.

Nezara graminea Fieb. (See under Cereal Insects.)

See also following species under Polyphagous Insects:

Agonoscelis pubescens Thunb.

Calidea bohemani (Stål)

Calidea dregii Germ.

Calidea duodecimpunctata (F.)

Calidea nana (Hahn & H.-S.)

Dolycoris penicillatus (Horv.)

Eusarcoris inconspicuus (H.-S.)

Nezara viridula (L.)

Piezodorus lituratus (F.)

Pyrrhocoridae (pyrrhocorid bugs)

Dysdercus cardinalis Gerst. Cotton, other Malvales. Somalia, Ethiopia, Sudan, Congo, east Africa, Aden. *Dysdercus* spp. feed on developing and ripe seed, transmit fungi of seed and lint causing serious damage; presence may be indicated by small dots on inner surface of boll wall and breakdown of boll content.

Dysdercus cingulatus F., red cotton stainer. Cotton, okra. Pakistan, Afghanistan, India, east Asia. Major pest in Pakistan.

Dysdercus fasciatus Sign. Cotton, okra. Sudan,* other areas south of Sahara, Malagasy Republic. Dominant species of *Dysdercus* in Sudan; one of most important cotton pests in southern Africa.

Dysdercus nigrofasciatus Stål. Cotton. Sudan, Ethiopia,* areas south of Sahara. Attacks open and green bolls. Serious pest in southern Africa. (Fig. 13.)

Dysdercus superstitiosus (F.). Cotton, kenaf, other Malvales. Sudan,* Ethiopia,* other areas south of Sahara. Important pest of lint and seed.

Rhopalidae (=Coreidae)

Liorhyssus hyalinus (F.). (See under Polyphagous Insects.)

Homoptera

Aleyrodidae (whiteflies)

Bemisia tabaci (Genn.). (See under Polyphagous Insects.)

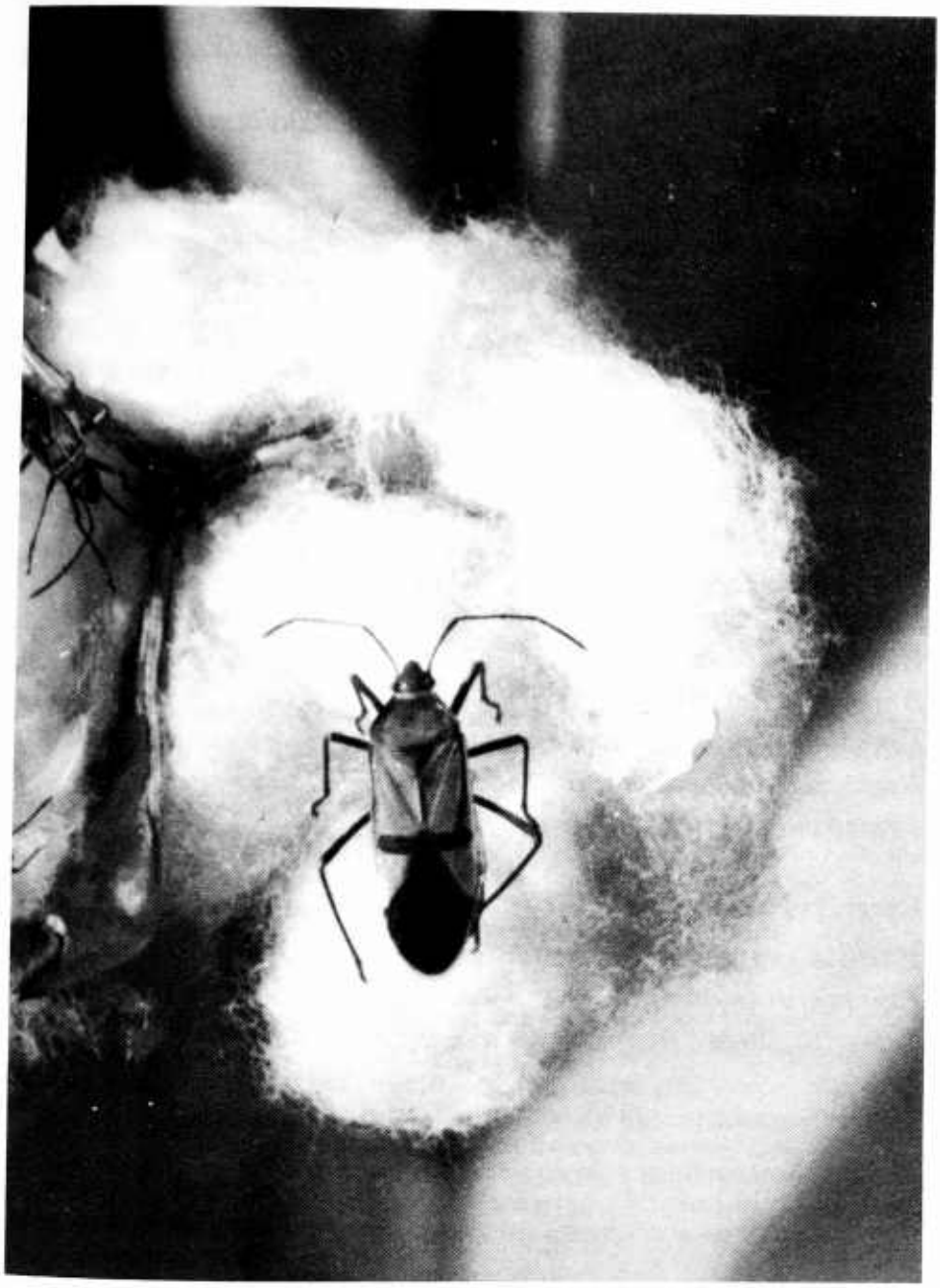

FIGURE 13.—*Dysdercus nigrofasciatus* adult in open cotton boll.

Aphidae (aphids)

See following species under Polyphagous Insects:

Aphis gossypii Glov.

Smynthurodes betae Westw.

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Asterolecaniidae (pit scales)

Asterolecanium pustulans (Ckll.). (See under Polyphagous Insects.)

Cerococcus hibisci Green. Cotton. West Pakistan, Kenya. Minor pest on leaf, stem, seedlings.

Cicadellidae (leafhoppers)

Kolla minica Dist. Cotton. West Pakistan. Minor pest.

Peragallia sinuata (M. R.). Cotton. Iran.* Collected from cotton but apparently not causing damage.

Scaphoideus aegyptiacus Mats. Cotton. Sudan. Heavy local infestations reported.

See also following species under Polyphagous Insects:

Empoasca decedens Paoli

Empoasca decipiens Paoli

Empoasca devastans Dist.

Empoasca facialis (Jac.)

Empoasca flavescens (F.)

Empoasca lybica (Berg.)

Erythroneura asiatica Kusn.

Erythroneura lubiae China

Coccidae (soft scales)

Filippia gossypii Bod. Cotton. Iran. Minor pest.

Pulvinaria maxima Green. Cotton. West Pakistan. Minor pest.

Saissetia nigra (Nietn.). (See under Polyphagous Insects.)

Diaspididae (armored scales)

Pinnaspis strachani (Cooley). (All records of *P. minor* (Mask.) in Africa should probably be referred to this species.) Cotton. Widespread in Africa. Only diaspid scale frequently found on cotton in Africa.

Pseudococcidae (mealybugs)

Pseudococcus corymbatus Green. Cotton. West Pakistan. Minor pest.

See also following species under Polyphagous Insects:

Ferrisia virgata (Ckll.)

Nipaecoccus vastator Mask.

Phenacoccus hirsutus Green

Lepidoptera

Arctiidae (tiger moths)

Amsacta moloneyi (Druce). Cotton. Sudan. Attacks seedling cotton some years.

Diacrisia punctulata (Wallg.). Cotton. Sudan, West Africa.

See also following species under Polyphagous Insects:

Amsacta lactinea (Cram.)

Amsacta moorei (Butl.)

Diacrisia investigatorum (Karsch)

Diacrisia obliqua (Wlk.)

Pericallia ricini (F.)

Cosmopterygidae

Pyroderces coriacella (Sn.). Cotton. Somalia, east Africa, Nigeria, Ceylon, Pakistan, parts of southeast Asia. Attacks open bolls. Minor pest in Pakistan.

Pyroderces simplex Wlsm., scavenger bollworm. Cotton, hibiscus, sorghum, castorbean, peas, other plants. Egypt, Somalia, other parts of Africa, Iran, India, other areas. Secondary pest on cotton.

Gelechiidae (gelechiid moths)

Mometa zemiodes Durr. Cotton. Sudan, Somalia, other areas of Africa south of Sahara. Larva resembles pink bollworm. Attacks open bolls, base of stem. Minor pest.

Pectinophora gossypiella (Saund.), pink bollworm. Cotton, okra, other Malvaceae. Egypt, Aden, Turkey, Iran,* Afghanistan,* Yemen,* Sudan, Tunisia, Libya, Pakistan, Ethiopia, Syria, Cyprus, Israel, Jordan, Somalia, many other areas of Africa and Asia, southern Europe, wide areas of world. Feeds on flower buds and bolls. Serious pest in Syria; major pest in Pakistan; about 27-percent loss in equatorial Sudan and 17-percent loss in Egypt (despite control in both areas). One of most important cotton pests, referred to as most notorious pest of cotton in world.

Platyedra malvella (Hbn.). Cotton, hollyhock, malvaceous herbs. Libya, Iran,* U.S.S.R. (Transcaucasia, Turkestan). Attacks square, flower, boll. Minor pest.

Platyedra villella (Zell.), cotton stem moth. Cotton, hollyhock, malvaceous herbs. Iran,* Israel, Iraq, U.S.S.R. (Transcaucasia, Turkestan), Morocco, parts of Europe. Attacks bud, boll, square of cotton. Minor damage usually in Iran and other areas, but serious in northern Iran in 1932; in Israel bores into terminals, infestations usually light.

Gracilariidae (leaf blotch miners)

Acrocercops bifasciata Wlsm., cotton leaf miner. Cotton, castorbean. Somalia, other areas of Africa south of Sahara. Makes serpentine mines in leaves. Reported to be important on seedlings in Somalia.

Lymantriidae (tussock moths)

Euproctis fasciata (Wlk.). Cotton (flower, leaf). Somalia, Nigeria, Uganda. Most *Euproctis* moths not serious on cotton.

Porthesia producta (Wlk.). Cotton. Pakistan, India, east Africa. Minor pest in Pakistan on leaf.

Porthesia xanthorrhoea (Koll.). Cotton, corn, sugarcane. West Pakistan. Minor pest.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Anomis flava (F.), cotton semilooper. Cotton, other Malvaceae. Pakistan, Sudan, Somalia, other areas of Africa, eastern Asia. Up to 25–30 per plant reported from India; outbreaks on cotton in Africa sporadic.

Anomis involuta (Wlk.). Cotton (leaf). Sudan.

Diparopsis watersi (Roths.), Sudan bollworm. Cotton, closely related Malvaceae. Aden, Yemen,* Ethiopia, Somalia, Sudan across equatorial Africa. Most important insect in Aden; serious in Somalia and some areas of Africa; requires control in Sudan. *D. castanea* Hmpsn. distributed south of Equator.

Earias biplaga Wlk. (In Africa term "spiny bollworm" refers to this species and *E. insulana.*) Cotton, other Malvales. Ethiopia, Somalia, Sudan, widespread south of Sahara in Africa. *Earias* spp. attack bud, flower, boll, square, stem. *E. biplaga* one of less injurious bollworms.

Earias cupreoviridis (Wlk.). Cotton, other Malvaceae. Pakistan, India, China, Africa south of Sahara. (*Earias* sp. near *cupreoviridis* determined from Yemen.*) Minor pest in Pakistan; occasionally injurious in Africa; reported serious in China; rare on cotton in India.

Earias fabia (Stoll), spotted bollworm. (*E. insulana* also known as spotted bollworm in India.) Cotton, okra. Pakistan, India, Afghanistan, southeast Asia to Australia. Attacks boll, square, stem. Injurious in Pakistan, Australia, Malaya, New Guinea; one of major pests in Java. Major pest of okra.

Earias insulana (Bdv.), spiny bollworm, Egyptian bollworm. Cotton, okra, other Malvaceae. Afghanistan,* Iran,* Israel, Lebanon, Jordan, Iraq, Sudan,* Somalia, Egypt, Saudi Arabia, Aden, Yemen,* Turkey, Syria, Cyprus, Pakistan, Libya,* Ethiopia,* India, Greece, Spain, Italy, U.S.S.R. (Transcaucasia). Whenever spiny bollworm

occurs, it is one of most serious cotton pests; attacks young stems and bolls causing infestation up to 75 percent. Prefers *Abutilon* in Aden; major pest of okra in Pakistan.

Euxoa tritici (L.). (See under Insects Affecting Solanaceous Crops.)

Tarache nitidula (F.). Cotton, *Cajanus*. Pakistan, India, Somalia, Nyasaland. Minor pest on leaf in Pakistan; serious some years in India.

Xanthodes graellsi (Feisth.). Cotton, okra, other Malvaceae, peanut, crucifers, some other plants. Aden, Iran,* Yemen,* Iraq, Pakistan, India, Sudan, Somalia, other African areas. Six generations per year in southern Africa. Foliage feeder. Minor pest in Aden, Pakistan, other areas; apparently held in check by parasites.

See also following species under Polyphagous Insects:

Agrotis flammatra (Denis & Schiff.)

Agrotis ipsilon (Hfn.)

Chrysodeixis chalcites (Esp.)

Cornutiplusia circumflexa (L.)

Diachrysia orichalcea (F.)

Eublemma brachygonia Hmpsn.

Euxoa conspicua (Hbn.)

Euxoa segetum (Denis & Schiff.)

Euxoa spinifera (Hbn.)

Heliothis armigera (Hbn.). (Fig. 14.)

Heliothis dipsacea (L.)

Heliothis peltigera (Denis & Schiff.)

Prodenia litura (F.)

Spodoptera exigua (Hbn.)

Trichoplusia ni (Hbn.)

Nymphalidae (brush-footed butterflies)

See following species under Polyphagous Insects:

Nymphalis polychloros (L.)

Vanessa cardui (L.)

Olethreutidae (olethreutid moths)

Crocidosema plebeiana Zell., hollyhock moth. Cotton, hollyhock, *Abutilon*. Iran,* Turkey, Italy, Egypt, Cyprus, Sudan, U.S.S.R. (Transcaucasia), Australia. Seems to prefer hollyhock; attacks boll, flower, seedling of cotton. Reported as pest in Italy and Australia; minor pest in Iran.

FIGURE 14.—*Heliothis* attacking cotton.

Cryptophlebia leucotreta Meyr. (See under Polyphagous Insects.)

Eccopsis wahlbergiana (Zell.). Cotton, castorbean. Ethiopia, Somalia, Uganda, Libya.

Phycitidae

Cryptoblabes gnidiella (Mill.). (See under Polyphagous Insects.)

Phycita infusella Meyr., cotton bud caterpillar. Cotton. West Pakistan, India. Pest of some importance in West Pakistan on bud and leaf, attacks seedlings.

Pyraustidae (pyraustid moths)

Ostrinia nubilalis (Hbn.). (See under Polyphagous Insects.)

Sylepta derogata (F.), cotton leaf roller. Mostly confined to Malvaceae, especially cotton and okra. Wide areas of Africa including Sudan and Somalia, Pakistan, India to Australia. Rolls edges of leaves and binds with webbing. Most destructive cotton foliage pest in India; major pest in Pakistan; parasites usually control outbreaks in Africa; dominant leaf-eating caterpillar in rain-fed cotton area of Africa and Asia. Minor pest on okra in Pakistan.

Coleoptera

Bostrichidae (false powder-post beetles)

Sinoxylon sudanicum Lesne. Cotton. West Pakistan. Minor pest.

Buprestidae (flatheaded wood borers)

Sphenoptera devorans Obenb. Cotton. Sudan. *Sphenoptera* spp. worse on perennial cotton or older, woody cotton.

Sphenoptera gossypii Cotes, cotton stem borer. Cotton, okra, other Malvaceae and legumes. Pakistan, Aden, Sudan, West Africa, India. Hollows out stem. On cotton major pest in Pakistan; minor pest in Aden; important in India; occasionally important in Sudan.

Sphenoptera kolbei Kerr. Cotton, okra. Sudan. Attacks stems.

Sphenoptera neglecta (Klug). Cotton (stem). Sudan to Senegal to southern Africa.

Sphenoptera patrizzii Obenb. Cotton (stems). Ethiopia, Somalia.

Sphenoptera scebelica Thery. Cotton. Somalia. Reported as pest.

Chrysomelidae (leaf beetles)

Longitarsus sp. Cotton. Yemen.* Light infestation on leaves.

Longitarsus gossypii Bryant. Cotton, *Cajanus indicus*. Sudan. Minor pest on leaves.

Nisotra dilecta (Dalm.). Cotton, okra, *Hibiscus* spp. Sudan to Nigeria. Minor pest of *Hibiscus* spp.

Nisotra pallida (Jac.). Cotton, related Malvales, some legumes. Somalia, Ethiopia, Sudan and westward in Africa. Adults feed on leaves causing shotholes. Together with *P. puncticollis* known as "cotton flea beetle" in Sudan. Major pest, especially on seedlings.

Pachnephorus bistriatus Muls. (See under Cereal Insects.)

Phyllotreta cheiranthi Weise. (See under Crucifer Insects.)

Podagrica sp. Hollyhock, *Malva* sp. Lebanon,* Iran.* Observed causing heavy damage to leaves.

Podagrica fuscicornis (L.). Kenaf. Iran, Greece. Adults attack germinating seeds. Medium to severe damage.

Podagrica malvae (Ill.). Okra, orange, cotton. Cyprus, U.S.S.R. (Transcaucasia).

Podagrica pallidicolor Pic. Cotton. Ethiopia.

Podagrica puncticollis Weise. Cotton, okra, other Malvaceae. Aden, Sudan, Ethiopia. Minor pest in Aden; serious infestations on seedling cotton in Sudan.

Syagrus rugiceps Lef. Cotton, other Malvaceae. Somalia, Ethiopia. Larvae of genus injure roots; adults feed on leaves, can cause serious loss on seedlings; one to two generations a year.

See also following species under Polyphagous Insects:

Aphthona fuentei Reit.

Aphthona latipennis Pic

Hermaeophaga ruficollis (Lucas)

Curculionidae (weevils)

Alcidodes affaber (Auriv.). Cotton, okra, kenaf. West Pakistan, India. Minor pest on stems.

Alcidodes fabricii (F.). Cotton. West Pakistan. Minor pest.

Apion radiolus Kirby. Malvaceae. Libya, Cyprus, Tunisia.‡

Corigetus instabilis Mshl. (=*Hamartus instabilis* (Mshl.)). Cotton, acacia. Yemen.‡ Collected in cotton, feeding not observed.

Myllocerus undecimpustulatus Faust var. ***maculosus*** Desbr., cotton gray weevil. Cotton, beans, corn, other plants. West Pakistan,* India. Major pest on leaf and root of cotton; minor pest on corn.

Pempherulus affinis (Faust), cotton stem weevil. Cotton, okra, other Malvaceae. West Pakistan, India. As many as six generations a year. Important on cotton in India, serious pest on seedlings.

Sibinia brunnula Mshl. Cotton. Sudan.

Sibinia planiuscula (Desbr.). Cotton, fig. Cyprus, Libya.

Sibinia sudanica Mshl. Cotton. Sudan.

Sibinia vitticollis Mshl. Cotton. Sudan.

Smicronyx gossypii Mshl. Cotton. Sudan.

Tanymecus hispidus Mshl. Cotton. West Pakistan. Minor pest.

Tanymecus musculus Fahr. Cotton, okra, some other plants. Egypt. Adults cause some damage.

Tanymecus sparsus Fahr. Cotton, sorghum. Sudan. Migrates to crops from weeds. Some control in Sudan.

See also following species under Polyphagous Insects:

Apion aestivum Germ.

Myllocerus undecimpustulatus Faust
Tanymecus indicus Faust

Elateridae (wireworms)

See following species under Polyphagous Insects:
Agriotes lineatus (L.)
Agriotes meticulosus Cand.
Conoderus bicarinatus Reit. (See under Insects Affecting Solanaceous Crops.)

Lagriidae

Lagria villosa F. (See under Insects Affecting Solanaceous Crops.)

Meloidae (blister beetles)

Coryna ambigua Gerst. (See under Insects Affecting Edible Legumes.)
Epicauta erythrocephala Pall. (See under Polyphagous Insects.)
Mylabris convexior Pic. Kenaf, cotton. Somalia, east Africa.

Scarabaeidae (scarabs)

See following species under Cereal Insects:
Adoretus rugulosus Burm.
Anisoplia segetum (Hbst.)
Heteronychus parumpunctatus Burm.
Pentodon bispinosus Küst.

Tenebrionidae (darkling beetles)

Gonocephalum pusillum (F.). (See under Insects Affecting Beets and Related Crops.)
Gonocephalum simplex (F.). (See under Polyphagous Insects.)
Opatriodes punctulatus Brullé. (See under Polyphagous Insects.)

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Contarinia gossypii Felt. Cotton. West Pakistan, India. Minor pest on flowers and stems in West Pakistan.

INSECTS AFFECTING POME AND STONE FRUITS

Principal crop species: Almond (*Prunus amygdalus*), apple (*Malus sylvestris*), apricot (*Prunus armeniaca*), cherry (*Prunus avium*, *P. cerasus*), peach (*Prunus persica*), pear (*Pyrus communis*), plum (*Prunus domestica* and *Prunus* spp.), quince (*Cydonia oblonga*).

Acarina

Eriophyidae (eriophyid mites)

Eriophyes pyri (Pagst.), pear leaf blister mite. Pear, apple, plum. Libya, Lebanon, Syria, Israel, Cyprus, Turkey, Greece, Egypt, Iran. Occasionally important in Syria; important in Iran and Turkey.

Eriophyes similis tipycus Nal. Plum. Iran. Causes galls on leaves, attacks buds and fruit. Rated severe.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus lanceolatisetae Attiah. Prune, apricot, pear, apple. Egypt.

Cenopalpus pulcher (C. & F.) (=*Brevipalpus geisenheyneri* (Rubs.), *B. pyri* Sayed, *B. oudemansi* (Geijskes)). Apple, pear, quince, loquat, poplar. Afghanistan,* Turkey, Iran, Cyprus, Israel, Lebanon, Syria, Egypt, Libya,* Europe. Serious on fruit in Turkey in 1959; considerable damage to apple in Cyprus and Iran; damage to buds and flowers of quince reported from Libya.

See also following species under Polyphagous Insects:

Brevipalpus californicus (Banks)

Brevipalpus obovatus Donn.

Brevipalpus phoenicis (Geijskes)

Tetranychidae (spider mites)

Bryobia praetiosa Koch complex (*B. rubrioculus* records probably involved), clover mites. Apple, pear, peach, hollyhock, other plants. Cyprus, Iran, Libya, Afghanistan, Turkey, Lebanon, Israel, many other areas. Heavy infestations on apple in Iran and stone fruit in Libya.

Bryobia rubrioculus (Scheuten). Cherry, apple, plum, pear. Iran,* Afghanistan,* Turkey, Lebanon,* Libya.* Severe damage to apple in Turkey; heavy populations reported from Iran and Libya; prevalent on apple at Kabul, Afghanistan, in 1961.

Eotetranychus pruni (Oudm.). Cherry, apple. Cyprus.

Panonychus ulmi (Koch), fruit tree spider mite, European red mite. Apple, other deciduous fruit. Tunisia, Egypt, Turkey, Iran, Europe,

U.S.S.R. (Transcaucasia). Minor importance in Tunisia; severe damage in Iran.

Tetranychus viennensis Zacher. Pome and stone fruits. Turkey. Serious infestations observed in 1959.

See also following species under Polyphagous Insects:

Tetranychus atlanticus McG.

Tetranychus telarius (L.)

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Anacridium aegyptium (L.)

Anacridium moestum melanorhodon (Wlk.)

Zonocerus variegatus (L.)

Isoptera

Termitidae (termites)

Microcerotermes diversus Silv. Fruit trees, other plants. Saudi Arabia, Iraq. Damage to nursery stock severe in Saudi Arabia.

Thysanoptera

Thripidae (thrips)

Retithrips syriacus (Mayet). (See under Polyphagous Insects.)

Scirtothrips mangiferae Pries. (See under Cotton Insects.)

Taeniothrips inconsequens (Uzel), pear thrips. Apple, pear, peach, cherry, some other fruit. Lebanon, Turkey, France, Cyprus, Iran.* Abundant in Lebanon; 10- to 20-percent damage on pear fruit in Turkey.

Heteroptera

Lygaeidae (lygaeid bugs)

Leptodemus bicolor ventralis Schm. Almond. Libya. Minor pest locally.

Oxycarenus lavaterae (Fieb.). (See under Cotton Insects.)

See also following species under Polyphagous Insects:

Nysius cymoides (Spin.)

Spilostethus pandurus (Scop.)

Pentatomidae (stink bugs)

See following species under Polyphagous Insects:

Dolycoris baccarum (L.)

Piezodorus lituratus (F.)

Tingidae (lace bugs)

Monosteira lobulifera Reut. Pear. Lebanon, Syria, Libya. Not important in Lebanon and Syria; destructive in Libya.

Monosteira unicostata (Muls. and Rey), almond bug. Almond, apricot, other stone fruits, pear, apple, hawthorn, willow, poplar. Mediterranean area including Tunisia,* Libya,* Cyprus, Turkey, Lebanon,* Syria; U.S.S.R. (Caucasus, Turkestan), Iran.* When abundant, can cause defoliation and heavy losses of yield; severe infestations observed in Tunisia on pear and in Lebanon on poplar; severe infestations on almond also reported from Libya.

Physatocheila confinis Horv. Pear. Turkey, Greece.

Stephanitis pyri (F.), pear lace bug. Many rosaceous fruits, also reported on chestnut, walnut, oak, poplar. Europe, Afghanistan, Cyprus, Iraq, Iran,* Israel, Jordan, Lebanon, Turkey,* Syria, Morocco, Tunisia, U.S.S.R. (Turkestan, Caucasus, Siberia). Causes significant damage to foliage, particularly apple and pear, which may lead to defoliation and loss of crop; severe infestations observed in Tunisia and Iran.

Homoptera

Aleyrodidae (whiteflies)

Siphoninus finitimus Silv. Apple, fig. Libya.* Serious pest locally.

Siphoninus granati Pr. & H. Pomegranate, pear, apple, ash. Sudan,* Egypt, Iran.* Produces sooty mold on lower surface of leaves; heavy infestation on ash in Iran.

Aphidae (aphids)

Aphis pomi DeG., apple aphid, green apple aphid. Apple, pear, quince. Afghanistan,* Pakistan, Lebanon, Libya, Turkey, Cyprus, Egypt, Iraq, Israel, Tunisia, Syria, Europe, widely distributed. Causes serious damage to apple.

Brachycaudus amygdalinus (Schtdn.). Peach, apricot, almond. Israel, Iraq, Iran, Turkey, Syria, Jordan, Libya,* southern Europe, central Asia. Abundant and damaging in Israel, Iran, Libya.

Brachycaudus cardui (L.). (See under Insects Affecting Miscellaneous Vegetables.)

Brachycaudus helichrysi (Kltb.). (See under Insects Affecting Ornamentals.)

Dysaphis plantaginea (Pass.) (=*Anuraphis rosea* Baker), rosy apple aphid. Apple. Tunisia,* Israel, Turkey, Iran,* Libya,* Afghanistan,* Lebanon, Cyprus. Serious pest in Lebanon.

Eriosoma lanigerum (Hausm.), woolly apple aphid. Apple. Jordan, Iraq,* Lebanon, Tunisia, Libya, Pakistan, Israel, Egypt, Iran, Turkey, Syria, Cyprus, cosmopolitan. Produces knots and swellings on branches and roots; large-scale control in Iraq; serious in Lebanon and Syria; 20-percent damage in Turkey; medium to heavy populations in Iran and Pakistan. (Fig. 15.)

Eriosoma lanuginosum (Htg.). Pear (roots), elm. Iran, Iraq, Syria, Turkey, Europe, north Africa, central Asia. Causes large pocket galls on end of elm twigs; serious pest in Iran.

Hyalopterus pruni (Geoff.) (=*arundinis*), mealy plum aphid. Peach, other rosaceous fruit, some grasses. Iran,* Afghanistan,* Pakistan, Israel, Iraq, Turkey, Lebanon,* Cyprus, Egypt, Libya,* Jordan, Syria, Tunisia, cosmopolitan. Heavy infestations on peach in Iran; abundant and damaging in Israel, Libya, Pakistan.

Lachnus pyri Buckt. Pear. Iran, Ceylon.

Myzus cerasi (F.), black cherry aphid. Cherry, several secondary hosts. Turkey, Lebanon, Europe. Considerable economic importance on cherry.

Myzus persicae (Sulz.). (See under Polyphagous Insects.)

Ovatus mespiliella (Theob.). Apple. Iran, Israel.

Pterochlorus persicae (Chol.). Peach, apricot, some other Rosaceae. Lebanon,* Israel, Egypt, Iran,* Afghanistan,* Pakistan, Cyprus, Iraq, Syria, Turkey, general distribution southern Europe to central Asia. Feeds on branches, causes sooty mold; may kill trees; peak populations in spring in Israel; heavy damage observed and reported from Iran, Afghanistan, Pakistan.

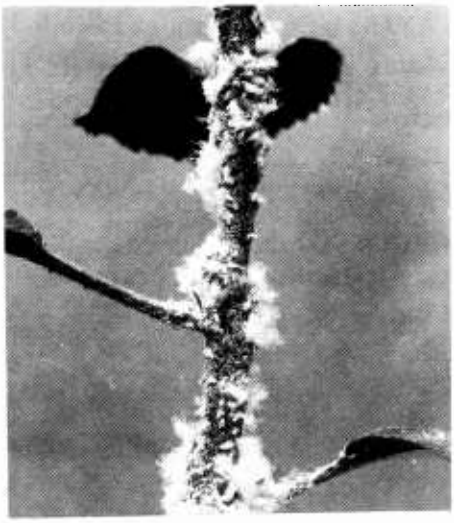

FIGURE 15.—*Eriosoma lanigerum* on apple.

Chermidae (bark aphids)

Aphanostigma piri (Chol.). Pear. Israel, U.S.S.R. (Crimea), Italy. Feeds on buds and bark; may destroy buds, causes bark cracking. Most abundant in autumn and winter in Israel.

Cicadellidae (leafhoppers)

See following species under Polyphagous Insects:

Empoasca decedens Paoli

Empoasca decipiens Paoli

Empoasca flavescens (F.)

Cicadidae (cicadas)

Paharia lacteipennis (Wlk.). Deciduous fruit, other trees. Pakistan, Afghanistan (specimens from Afghanistan determined from description).* Rated as important pest in Pakistan; heavy population reported from Afghanistan.

Psalmocharias quaerula (Pall.). Deciduous fruit. Pakistan, Afghanistan, Iran, U.S.S.R. (Caucasus). Rated as important pest in Pakistan.

Psalmocharias rugipennis (Wlk.). Deciduous fruit, other trees. Pakistan, Afghanistan (specimens determined from description).* Rated as important pest in Pakistan; heavy populations reported from Afghanistan.

Coccidae (soft scales)

Ceroplastes sinensis Del G. (See under Polyphagous Insects.)

Eriochiton amygdalae Rao. Almond, peach, apple, quince. West Pakistan. Reduces vitality of tree by attacking branches. Important pest.

Eulecanium bituberculatum Targ.-Tozz. Pome and stone fruits. Iraq, Iran. Minor pest.

Eulecanium rugulosum (Arch.). Pear, apple, some other fruit and shade trees. Iran. Attacks twigs and branches, sometimes severe.

Lecanium corni Bouché (status of *Lecanium* confused according to H. M. Morrison, U.S. Dept. Agr.), European fruit lecanium. Apricot, pear, other deciduous fruit and trees. Libya,* Lebanon, Egypt, Europe.

Lecanium coryli (L.). Peach, plum, other deciduous fruit, walnut, oak, other trees. Pakistan, Turkey, Iran. Moderate to heavy damage to twigs and branches in Pakistan; sometimes severe in Iran.

Lecanium persicae (F.) (=*berberidis* Schr.), European peach scale. Deciduous fruit, citrus, grape. Tunisia, Cyprus, Iran, Egypt. Abundant in Tunisia; sometimes severe infestations in Iran.

Lecanium prunastri (Forsc.), globose scale. Plum, other stone fruit. Lebanon, Iran, Turkey. Not important in Lebanon; sometimes severe infestations in Iran.

Lecanium turanicum Arch. Apple, plum, peach. Afghanistan (specimens determined as possibly this species).* Moderate to heavy infestations reported.

Pulvinaria betulae (L.). (See under Grape Insects.)

Diaspididae (armored scales)

Aspidiotus (Diaspidiotus) prunorum Laing. Cherry, almond, apple, other pome and stone fruit trees. Iran, West Pakistan. Attacks twigs, branches, trunk. Minor to medium damage in Iran; serious on almond in West Pakistan.

Aspidiotus (Quadraspidiotus) ostreaformis Curt. European fruit scale. Apple, plum, some shade trees. Iran, Europe. Minor pest.

Aspidiotus (Quadraspidiotus) perniciosus Comst. San Jose scale. Deciduous fruit, other trees and shrubs. Iraq, Pakistan, southern Europe, widespread in other subtropical and tropical areas. Serious pest in Pakistan and other areas.

Chionaspis asiatica Arch. Plum, other deciduous fruit. Iran, U.S.S.R. Heavy infestations on leaves and twigs reported from areas of Iran.

Epidiaspis leperii (Sign.). Pear, apple, other rosaceous trees. Libya, other north African areas, Iran, Turkey, southern Europe. Apparently minor pest in north Africa and Iran.

Lapazia peshawarensis Rah. & Ans. Plum, peach. West Pakistan.

Lepidosaphes baluchistanensis Rao. Deciduous fruit. Pakistan. Rated major pest.

Lepidosaphes ficus (Sign.). (See under Insects Affecting Miscellaneous Fruits.)

Lepidosaphes malicola Borchs. Apple, sometimes apricot and peach. Iran.* Heavy infestations noted on apricot in Iran in 1959.

Lepidosaphes ulmi (L.), oystershell scale. Fruit trees, olive, other deciduous trees. Iran, Cyprus, Iraq, Israel, Turkey, Tunisia, Libya, Ethiopia, Egypt, Europe into central Asia. Minor to heavy infestations reported from Iran. (Fig. 16.)

Nilotaspis halli (Green), Hall scale. Stone fruit, pear, apple. Egypt, Libya, Iran, Iraq, Pakistan. Severe pest in Iran and Pakistan; minor in Libya.

Parlatoria proteus (Curt.). (See under Citrus Insects.)

Phenacaspis (Tecaspis) prunorum Borchs. Apricot, plum, almond, other fruit trees. Iran. Common on leaves and twigs.

Pseudaulacaspis pentagona (Targ.-Tozz.), white peach scale. Deciduous fruit, some other plants. Turkey, Israel, Syria, Egypt, southern Europe, widespread in temperate regions of world. Important pest in Turkey. (Fig. 17.)

FIGURE 16.—*Lepidosaphes ulmi.*

Quadraspidiotus pyri (Licht.). Apricot, apple, pear, some other fruit trees. Iran, parts of Europe. Infests trunks. Minor pest in Iran.

Salicicola archangelskyae (Ldgr.). Apple, pear, plum, other deciduous fruit. Iran. Severe attacks on branches and trunks.

Voraspis adlei Bal. & Kaus. Apricot. Iran. Medium importance on leaves and twigs in Iran.

See also following species under Polyphagous Insects:

Aspidiotus hederae (Vall.)

Aspidiotus lantaniae Sign.

Melanaspis inopinata (Leon.)

Parlatoria cinerea Hadd.

Parlatoria oleae (Colv.)

Pseudococcidae (mealybugs)

Phenacoccus aceris (Sign.), apple mealybug. Apple, other fruit and shade trees. Iran, Europe. Medium importance in Iran.

FIGURE 17.—*Pseudaulacaspis pentagona.*

See also following species under Polyphagous Insects:

Pseudococcus comstocki (Kuw.)

Pseudococcus maritimus (Ehrh.)

Psyllidae (psyllids)

Psylla sp. Pear. Afghanistan.* Heavy and damaging infestations observed.

Psylla pyricola Foerst., pear psylla. Pear. Lebanon, Syria, Afghanistan,* Israel, Turkey, Iran, Pakistan, U.S.S.R., Europe. Serious pest in Lebanon, Syria, Pakistan, Iran, Afghanistan; serious some years in Israel where there are 10–11 generations per year.

Lepidoptera

Aegeriidae (clearwing moths)

Aegeria (Synanthedon) myopaeformis (Bork.), apple clearwing moth. Fruit trees. Cyprus, Lebanon, Turkey, north Africa, Europe. Serious injury to trunks in Cyprus, old trees preferred.

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Arctiidae (tiger moths)

Axiopoena maura (Eichw.). Apricot. West Pakistan. Attacks leaves.

Coleophoridae (casebearer moths)

Coleophora hemerobiella Scop. Apple, plum. Lebanon. Not important pest.

Coleophora mosipennella Dup. Apple. Iraq. Feeds on young leaves. Minor pest.

Cossidae (carpenterworm moths)

Cossus ligniperda L. Apricot. Lebanon. Reported to be serious pest.

Cossus (Trypanus) cossus L., goat moth. Grape, various trees including elm, fruit, poplar, willow. Iraq, Afghanistan, Turkey, Iran, Europe, north Africa. Bores into wood. Medium importance in Iran.

Zeuzera pyrina (L.), leopard moth. Apple, pear, olive, other trees. Syria, Tunisia,* Libya, Lebanon, Israel, Iran, Iraq, Afghanistan, Turkey, Egypt, Cyprus, Europe to Japan. Extensive damage in Lebanon, Tunisia, Syria; heavy in Iran; destructive to olive and apple in Israel. Serious pest.

Gelechiidae (gelechiid moths)

Anarsia lineatella Zell., peach twig borer. Peach, almond, apricot, other stone fruit. Lebanon,* Iran,* Tunisia,* Libya, Syria, Cyprus, Iraq, Israel, Pakistan, Turkey, Egypt, Europe, other areas. Serious infestations in Syria, Pakistan, Libya; about 20-percent damage in Turkey; economic infestations observed in Lebanon.

Recurvaria nanella (Hbn.), lesser bud moth. Apple, quince, apricot, other stone fruit. Lebanon, Egypt, Syria, Turkey, Iran, Cyprus, Greece. Serious infestations in Lebanon and Iran on new growth; injurious in Cyprus.

Geometridae (geometrid moths)

Lycia hirtaria (Cl.). Apple, pear, quince, shade trees. Iran. Medium damage to leaves.

Nychiodes variabilis Brandt. Apricot, other stone fruit. Iraq, Turkey, Iran.

Operophtera brumata (L.), winter moth. Deciduous fruit, hardwoods. Algeria, Tunisia, most of Europe, parts of U.S.S.R. Feeds on buds, foliage, fruit. Major pest of fruit and forest trees.

Glyphipterygidae

Anthophila (Simaethis) pariana (Cl.), apple-and-thorn skeletonizer. Apple. Iran,* Turkey. Some importance in Iran.

Gracilariidae (leaf blotch miners)

Lithocolletis blancardella F. Apple, pear. Lebanon. Not important.

Hyponomeutidae (plutellid moths)

Argyresthia conjugella Zell., apple fruit moth. Fruit. Turkey, Europe, U.S.S.R.

Hyponomeuta evonymellus (L.). Peach, other fruit. Iran,* Europe. Adults collected from peach in Iran. Species of some importance in Europe.

Hyponomeuta padellus (L.), lesser ermine moth, ermine moth. Cherry, apple, almond, apricot, willow. Iran,* Afghanistan,* Pakistan, Turkey, Cyprus, Syria, Europe. Feeds on and webs terminals. Very destructive in Afghanistan, Pakistan, Cyprus; 15- to 25-percent damage in Turkey.

Lasiocampidae (tent caterpillar moths)

Malacosoma indica (Wlk.). Almond, apple. Afghanistan, Pakistan. Up to 50 percent of trees attacked in Punjab area, Pakistan.

Malacosoma neustria (L.), lackey moth. Many fruit and forest trees, ornamentals. Turkey, Iran, Europe. Important orchard defoliator some years. Injurious in Europe; causes only about 2-percent damage in Turkey.

Taragama repanda (Hbn.). Seems to prefer *Schinus molle*, attacks plum, other trees. Tunisia, other north African areas, Spain. Minor pest.

Lymantriidae (tussock moths)

Euproctis signata (Blanch.), hairy caterpillar. Deciduous fruit and shade trees. West Pakistan, Afghanistan. Severe damage on apple in West Pakistan.

Lymantria destituta (Staud.). Almond. Israel. Feeds on leaves.

Lymantria lapidicola (H.-S.). Almond. Lebanon, Iraq, Israel.

Nygmia phaeorrhoea (Don.), brown-tail moth. Almond, other fruit and forest trees. Syria, Iran, Turkey, Tunisia, Europe. Causes defoliation in Syria; minor pest in Iran; important in Europe.

Porthetria dispar (L.), gypsy moth. Deciduous forest and fruit trees. Iran, Tunisia, Lebanon, Iraq, Turkey, Afghanistan, Israel, Syria, north Africa through Europe and Asia to Japan. Not important on fruit in Lebanon; serious in Iraq; serious on hazelnut in Turkey, causing up to 90-percent damage; important in Iran.

Lyonetiidae

Leucoptera scitella (Zell). Apple, pear, pistachio. Iran. Leaf miner causing medium to severe damage.

Lyonetia clerkella (L.). Deciduous fruit, birch. Tunisia, Israel, Iran, Lebanon, Syria, Egypt, Libya, Turkey, Cyprus, Europe. Mines leaves. Not very important in Tunisia; occasionally important in Lebanon, Syria, Libya, Iran.

Momphidae

Blastodacna libanotica Dkff. Pear. Lebanon. Produces galls on twigs. Minor importance.

Noctuidae (=Phalaenidae) (owlet moths)

Acronicta rumicis (L.). Apple, *Prunus* sp., other plants. Iraq, Lebanon. Probably not important.

Episema caeruleocephala (L.). Apple, stone fruit. Lebanon, Syria, Israel, Turkey, Europe. Defoliates stone fruit. Sometimes serious damage.

Heliothis nubigera H.-S. (See under Polyphagous Insects.)

Notodontidae (notodontid moths)

Phalera bucephala (L.). Fruit and forest trees. Turkey, Europe.

Nymphalidae (brush-footed butterflies)

Nymphalis polychloros (L.). (See under Polyphagous Insects.)

Olethreutidae (olethreutid moths)

Carpocapsa pomonella (L.), codling moth. Apple, pear, walnut. Syria, Tunisia,* Lebanon,* Libya,* Iran,* Iraq,* Pakistan, Afghanistan,* Turkey, Jordan, Cyprus, Israel, north Africa, Europe through central Asia, widespread in other areas of world. Five generations in Israel. Major pest whenever apples grown in northeast Africa-southwest Asia; up to 50-percent damage in Iran and Turkey; limiting factor in apple production in Afghanistan; very serious pest in Cyprus, Syria, Pakistan.

Cryptophlebia leucotreta (Meyr.). (See under Polyphagous Insects.)

Grapholitha funebrana Treits., plum fruit maggot, red plum maggot. Plum and other stone fruit, reported from apple and walnut. Turkey, Cyprus, Iran,* Syria, Algeria, temperate Europe through Siberia (U.S.S.R.). Gum threads exuded from punctures. Serious pest of plum in wide areas of Europe; damaging in Algeria and western Asia; up to 80-percent damage in Syria; severe in Iran.

Grapholitha molesta (Busck), oriental fruit moth. Peach and other fruit. Turkey, southern Europe. Important infestation in Bursa area, Turkey. (Fig. 18.)

Hedya nubiferana (Haw.) (=*Argyroploce variegana* (Hbn.)), fruit tree tortrix moth. Quince, hawthorn. Syria, Lebanon, Iraq, Europe. Occasionally important pest.

Hedya pruinana (Hbn.), plum tortrix moth. Apple. Lebanon. Occasional pest.

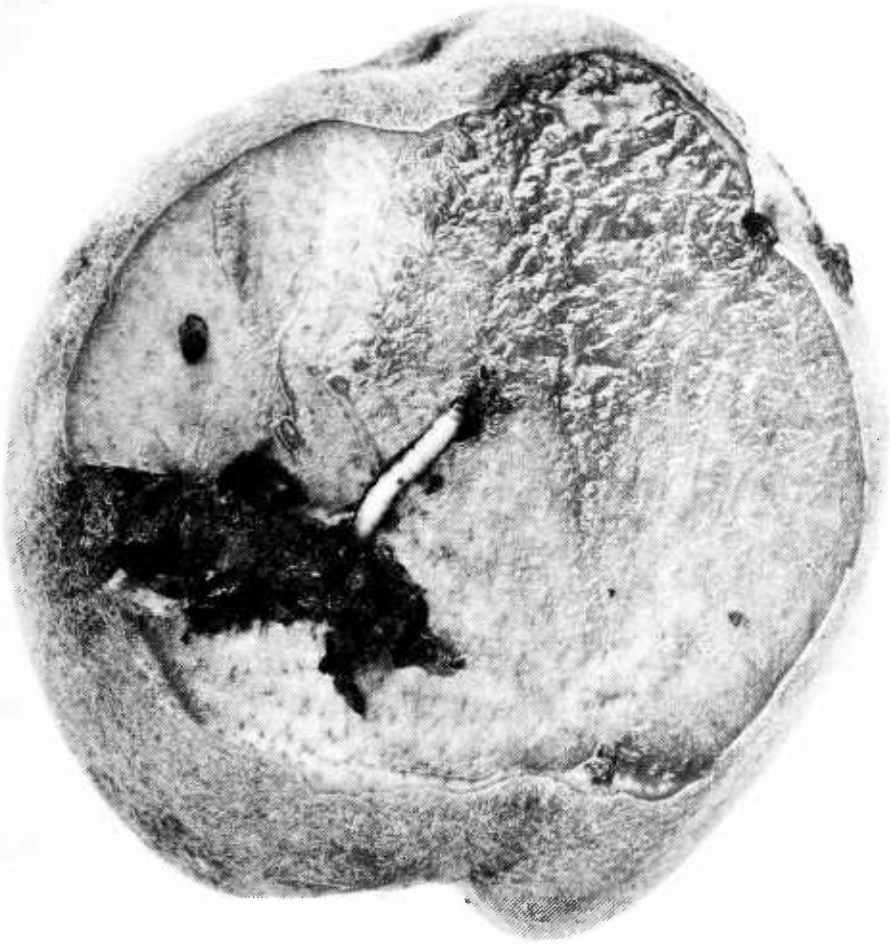

FIGURE 18.—*Grapholitha molesta* larva in peach.

Pammene rhediella (Cl.). Apple, plum. Turkey, central U.S.S.R., Europe. Feeds in fruit. Occasionally causes heavy damage.

Spilonota ocellana (Denis & Schiff.), eye-spotted bud moth. Apple and quince preferred, stone fruit. West Pakistan, Europe. Serious pest in Baluchistan.

Papilionidae (swallowtail butterflies)

Iphidicles podalirius (L.), pear tree swallowtail. Apple, pear, other Rosaceae. Lebanon, Iran, Turkey, Iraq, Tunisia, Europe. No appreciable damage.

Phycitidae

Acrobasis noctuana (Hbn.). Pear. Syria. Feeds on flower buds and young leaves.

Cryptoblabes gnidiella (Mill.). (See under Polyphagous Insects.)

Euzophera punicaella (Moore). (See under Insects Affecting Miscellaneous Fruits.)

Pieridae (whites, sulfur butterflies)

Aporia crataegi (L.), black-veined white. Apple, pear, cherry, hawthorn, wild rosaceous fruit. Lebanon,* Iraq, Afghanistan,* Turkey, Iran, Cyprus, north Africa, Europe across Asia to Japan. One generation per year in Iraq; small larvae gregarious, spin webs. Occasionally important.

Saturniidae (giant silkworm moths)

Saturnia pyri (Schiff.), great peacock moth. Apple, pear, willow, plum. Lebanon, Syria, Turkey, Iran, temperate Europe, north Africa. Occasional importance.

Tortricidae (leaf roller moths)

Acleris variegana (Denis & Schiff.). Apple, pear. Lebanon. Can be serious pest in Lebanon.

Archips philippa (Meyr.). Deciduous fruit. West Pakistan. Minor pest.

Archips pomivora (Meyr.). Deciduous fruit. West Pakistan. Sometimes serious pest.

Archips rosana (L.). Apple, other plants, polyphagous. Iraq, Turkey, Iran, Europe. Damaging in Iran and parts of Europe.

Archips sarcostega (Meyr.). Deciduous fruit. West Pakistan. Serious damage to foliage and ripening fruit.

Archips subsidiaria (Meyr.). Plum, peach, apple. West Pakistan. Serious injury to blossoms.

Cacaecimorpha pronubana (Hbn.). Apple, pomegranate, olive, carnation. Libya,* areas in Europe. Attacks leaves. Important pest in some areas.

Clepsis unifasciana Dup. Apple. Lebanon. Occasionally important.

Coleoptera

Bostrichidae (false powder-post beetles)

Apate monacha F. (See under Polyphagous Insects.)

Sinoxylon perforans (Schr.). Plum, apple, grape. Lebanon, Syria, southern U.S.S.R. Not important in Lebanon, secondary pest.

Buprestidae (flatheaded wood borers)

Agrilus sinuatus (Ol.). Pear, apple, hawthorn, some other deciduous trees. Iran, Europe. Larvae make narrow burrows in inner bark and sapwood. Severe pest in Iran.

Anthaxia bicolor Fald. Fruit trees. Iran, southern U.S.S.R., central Asia.

Anthaxia (Haplanthaxia) cichorii (Ol.). Deciduous fruit, oak, poplar. Iran, Algeria, France, parts of U.S.S.R. Attacks weakened trees.

Capnodis anthracina (Fisch.). Fruit trees, pistachio. Iran. Minor pest.

Capnodis carbonaria Klug, almond borer. Almond, apricot, plum, pistachio. Lebanon,* Iran, Afghanistan,* Israel, Syria, Turkey, Greece. Larvae develop in roots and collar, can kill trees. Major pest in Israel, especially on almond.

Capnodis henningi Fald. Almond, peach, apricot. Iran.

Capnodis kashmirensis Fairm. Peach, apricot, other trees. West Pakistan. Tunnels in branch and trunk, sometimes killing tree. Major pest.

Capnodis parumstriata Ball. (See under Nut Insects.)

Capnodis porosa Klug. Almond, poplar, *Prunus* spp. Lebanon,* Iran, Israel. Slight importance in Israel.

Capnodis tenebrionis (L.), peach buprestid. Peach, related stone fruit. Lebanon,* Tunisia, Syria, Turkey, Israel, other Mediterranean areas, southern Europe eastward to Iran and parts of U.S.S.R. Larvae kill young trees by boring into lower trunk and root; adults feed on foliage and bark. One of most important pests of stone fruit in Mediterranean region.

Chalcophorella stigmatica Schoen. Almond. Israel. Serious pest

Chrysobothris affinis (F.). Peach, some other trees. Egypt, Cyprus, Algeria, southern U.S.S.R., parts of Europe. Feeds under bark, may attack only weakened trees.

Cratomerus fedtschenkoi (Sem.). Cherry, other fruit trees. Iran, Afghanistan, southern U.S.S.R.

Perotis (Aurigena) chlorana (Lap. & Gory). Prune, apple, almond, other deciduous fruit. Lebanon,* Syria, Israel, Cyprus, Iran, Greece. Occasionally important in Syria; adults cause minor injury in Iran; serious on almond in Israel.

Perotis (Aurigena) lugubris (F.). Apricot, cherry, rose. Iran, Turkey, Algeria, Europe, parts of U.S.S.R. Adults feed on young growth. Minor pest in Iran.

Ptosima undecimmaculata (Hbst.). Deciduous fruit trees. Iran, Lebanon, Egypt, Turkey, Cyprus, Europe into west Asia. Adults active in May; larvae bore into weakened trees. Damaging in neglected orchards. Severe damage in Iran.

Sphenoptera dad-khani Obenb. (=*lafertei* Thoms.). Peach. Pakistan, India. Serious borer in Pakistan and India.

Sphenoptera davatchii (Desc.). Stone fruit. Iran, widely distributed pest.

Sphenoptera kambyses Obenb. Deciduous fruit trees, citrus. Iran. Adults appear in May; 1-year cycle. Attacks vigorous trees. Serious pest.

Cerambycidae (roundheaded wood borers)

Aeolesthes holosericea (F.). Fruit trees, walnut, some other trees. West Pakistan, India. Important wood borer causing severe damage; single larva may kill young apple tree.

Aeolesthes sarta (Solsky), Quetta borer. Peach, apple, walnut, poplar, elm, willow, other trees. West Pakistan, Afghanistan,* Iran. Important pest causing extensive damage to trunks of trees leading to breakage or death; severe infestations observed in Afghanistan.

Apatophysis modica Gahan. Deciduous fruit. West Pakistan. Minor pest.

Apriona cinerea Chevr. Apple. West Pakistan. Serious injury to trunks and branches.

Cerambyx cerdo L. Apricot, apple, pear, cherry. Lebanon,* Turkey, Egypt, middle and southern Europe.

Cerambyx dux (Fald.) (=*C. heros* Scop.). Plum, peach, apricot, almond, walnut, some forest trees. Lebanon,* Syria, Israel, Iran, Cyprus, Greece. Adults emerge from May to June; 30 to 50 larvae may be found per tree, all stages; pupation in trunks; life cycle about 1 year. Serious trunk borer in Lebanon and Israel; minor pest in Iran; damage reported from Cyprus. (Fig. 19.)

Cerambyx miles Bon. Apple, pear. Cyprus. Recorded as killing large number of trees annually.

FIGURE 19.—*Cerambyx dux* adult.

Chlorophorus figuratus (Scop.). Fruit and forest trees. Iran, Turkey. Minor pest in Iran.

Chlorophorus varius Müll. Fruit and forest trees, grape. Turkey, Iran, Israel, Cyprus, Egypt. Bores into trunks. Minor pest in Iran; some damage to grape in Egypt.

Megopis (Aegosoma) scabricornis Scop. Apricot. Libya. Bores in branches.

Osphranteria coerulescens Redtb. Fruit trees. Iran. Adults active in May. Severe damage in central Iran, kills branches.

Phymatodes varius (F.), wasp beetle. Peach. Egypt. Attacks wood.

Quettania coeruleipennis Sch. Cherry. West Pakistan. One generation per year. Attacks small branches. Major pest.

Stenopterus ater (L.). Apricot. Tunisia. Damage to branches.

Chrysomelidae (leaf beetles)

Labidostomis propinqua (Fald.). Stone fruit. Turkey.

Longitarsus pellucidus Foud. Apple. Lebanon. Not important.

Megalongnatha aenea Lab. Peach, avocado, acacia. Ethiopia, Kenya, Uganda.

Mimastra cyanura Hope. Pear, peach, almond. West Pakistan. Large numbers skeletonize leaves.

Necyomantes sp. Almond. Iran.* Medium population observed on leaves.

Necyomantes judaica (Lef.). Apple. Lebanon. Not important.

Necyomantes limbata (Stev.). Apple, pear. Lebanon. Not important.

Curculionidae (weevils)

Anthonomus cyprius Mshl. Apricot, peach. Lebanon, Cyprus. Larvae feed in buds. Occasionally important.

Anthonomus pomorum (L.), apple blossom weevil. Apple, pear preferred, some other rosaceous hosts. Turkey, Lebanon, Cyprus, Syria, Iran, Europe across Asia. Long history of damage in Europe and Asia, especially serious when blossoming is light; severe damage in Iran.

Hyperstylus lineatus Mshl. Apple leaves. West Pakistan.

Magdalis cerasi (L.). Pear, related fruit. Lebanon, Europe into U.S.S.R. (Siberia). Not important in Lebanon; occasionally damages branches in Europe.

Polydrosus pilifer Hochh. Almond. Afghanistan.† Light population noted.

Rhamphus pulicarius (Hbst.). Apple. Lebanon, Syria. Feeding makes brown spots on new leaves. Not important in Lebanon.

Rhynchites auratus (Scop.), golden apricot weevil. Apricot, cherry, almond, plum. Syria, Lebanon, Iran, Yugoslavia, Turkey, Iraq, Greece. Bores broad holes in fruit, develops in seed. Extensive damage in Iran; important in Syria and Iraq.

Rhynchites baccus (L.). Apple, pear, other fruit. Turkey, Iran, Europe. Larvae feed in fruit; adults attack buds, flowers, young fruit. Severe damage.

Rhynchites cupreus (L.), plum borer. Plum, cherry, other fruit. Iran, Europe. Attacks buds, flowers, young fruit. Medium damage in Iran.

Rhynchites giganteus Kryn. Pear, some other fruit. Iran. Larvae feed in fruit; adults attack buds, flowers, young fruit. Medium importance.

Rhynchites heros Roelofs. Cherry. Iran. Larvae feed in fruit; adults attack buds, flowers, young fruit. Medium importance.

Rhynchites (Lasiorhynchites) praeustus (Boh.). Plum. Lebanon. Not important.

Rhynchites (Lasiorhynchites) praeustus (Boh.). Plum. Lebanon. Occasionally important.

See also following species under Polyphagous Insects:

Platymycterus marmoratus (Faust)

Tanymecus dilaticollis Gyll.

Malachiidae

Malachius bipustulatus L. Apple, pear. Lebanon. Occasionally important on pear.

Nitidulidae (sap beetles). (See under Insects Affecting Stored Products.)

Scarabaeidae (scarabs)

Adoretus persicus Reit. Apple, pear, cherry, other trees. Iran. Adults feed heavily on foliage at night.

Adoretus pullus Baudi. Almond. Cyprus. Feeds on leaves.

Amphicoma vulpes (F.). Sometimes apricot and cherry. Iran. Adults feed on flowers.

Cetonia aurata (L.). Rose, apple, pear, apricot, other fruit. Iran, Egypt, parts of Europe. Adults attack young leaves, flowers, young fruit.

Epicometis senicula (Méné.). Apple, pear, other deciduous fruit. Iran. Adults attack flowers.

Epicometis turanica (Reit.). Cherry, other fruit. West Pakistan. Severe damage to blossoms, causing reduction in fruit set.

Melolontha kraatzi persica Reit. (=*M. tibialis* Kraatz). Apple, pear, other fruit trees, some deciduous trees. Iran. Larvae attack roots of field and nursery stock; adults feed on leaves.

Oxythyrea tripolitani (Reit.). Fruit. Libya.

Pachnoda fasciata (F.). Peach, rose. Egypt. Feeds on ripening peaches and flowers of other plants.

Phaeadoretus comptus Méné. Grape, almond, other stone fruit. Iran. Adults feed on leaves; larvae attack roots. Severe damage.

Phyllognathus dionysius (F.). (See under Cereal Insects.)

Phyllognathus excavatus (Forst.) (=*silenus* F.). Deciduous fruit. West Pakistan. Minor pest.

Polyphylla adspersa Motsh. Fruit trees, nurseries. Iran, Pakistan, Turkey, U.S.S.R. Larvae feed on roots, minor to serious damage; adults fly at nightfall.

Polyphylla alba (Pall.). Grape and fruit trees. Iran. Larvae attack roots, particularly nursery plants.

Potosia cuprea hiroglyphica Méné. Pear, quince. Iran. Adults attack flowers.

Potosia hungarica (Hbst.). Composite flowers, sometimes fruit. Iran. Adults attack flowers.

Protaetia affinis (Anders.). Deciduous fruit. West Pakistan. Minor pest.

Protaetia impavida (Jans.). Deciduous fruit. West Pakistan. Minor pest.

Stalagmopygus albella (Pall.). Cherry. West Pakistan. Severe damage to blossoms.

Valgus hemipterus (L.). Apple, other fruit, ornamentals. Turkey, Iran. Minor damage on blossoms and leaves.

See also following species under Polyphagous Insects:

Anoxia pilosa F.

Epicometis hirta Poda

Oxythyrea abigail Reiche & Saulcy

Oxythyrea cinctella (Schaum)

Oxythyrea funesta (Poda)

Oxythyrea pantherina (Gory & Perch.)

Pentodon bispinifrons Reit.

Pentodon idiota (Hbst.)

Polyphylla fullo (L.)

Polyphylla olivieri (Lap.)

Tropinota squalida (Scop.)

Scolytidae (bark beetles)

Anisandrus dispar (F.). (See under Nut Insects.)

Scolytus sp. Cherry. Iran. Larvae attack inner bark of old and dying trees, causing severe damage.

Scolytus amygdali Guer. Plum, other stone fruit, apple, quince. Libya,* Lebanon, Turkey, West Pakistan, Egypt, Cyprus, Israel. Four generations a year. Major pest in West Pakistan; heavy damage in Libya; occasionally important in Lebanon.

Scolytus fasciatus Reit. Deciduous fruit. West Pakistan, U.S.S.R. (Turkestan). Minor pest.

Scolytus mali (Bechst.) (=*pruni* Ratz.), larger shot-hole borer. Apple, cherry, pear. Turkey, Iran, Europe into Siberia. Economic damage in Turkey and Iran; considered secondary pest in Europe.

Scolytus mediterraneus Egg. Stone fruit, apple, pear. Libya. Important in Libya.

Scolytus (Ruguloscolytus) rugulosus (Ratz.), shot-hole borer. Apple, other fruit trees. Syria, Lebanon, Turkey, Egypt, Libya, Cyprus, Europe into U.S.S.R. Serious pest in Lebanon, Syria, Iran; most important scolytid on fruit in Europe.

Hymenoptera

Cephidae (stem sawflies)

Janus compressus (F.). Pear. Tunisia, Turkey. Feeds in terminals.

Cimbicidae (cimbicid sawflies)

Cimbex quadrimaculata (Mueller). Almond preferred, apricot, other stone fruit. Lebanon,* Syria, Turkey, Israel, Italy, central and southern Europe. One generation per year. Serious on almond in Lebanon and Israel.

Eurytomidae (eurytomids, seed chalcids)

Eurytoma amygdali End., almond nut borer. Almond, stone fruit. Iran,* Afghanistan, Lebanon, Jordan, Israel, Syria, Turkey,* Cyprus, Greece, Bulgaria, southern U.S.S.R. Attacked fruit turns brown. Serious in many areas, up to 100-percent loss.

Eurytoma samsonovi Vass. Apricot, peach, plum. West Pakistan. Considerable injury to apricot fruit.

Tenthredinidae (sawflies)

Caliroa cerasi (L.) (=*Eriocampoides limacina* Ratz.), pear-slug. Pear, cherry, other stone fruit. Lebanon, Israel, Syria, Turkey, Iran, Greece. Not important in some areas; causes 10-percent damage in Turkey; severe injury in Iran. (Fig. 20.)

Hoplocampa brevis (Klug), pear sawfly. Pear major host, plum, apple. Turkey, Syria, Turkestan (U.S.S.R.), most of Europe. Important on pear in many areas of Europe; 60 to 80 percent of fruit attacked in Crimea and Syria.

Hoplocampa flava (L.), plum fruit sawfly. Plum. Lebanon, Israel, Turkey, Syria, Europe. Important pest.

Hoplocampa minuta (Christ) (=*H. fulvicornis* F.). Plum, apricot, other fruit trees. Iran, Europe. Larvae attack fruit, feed inside seed. Severe pest in wide areas.

Hoplocampa testudinea (Klug), apple sawfly, European apple sawfly. Apple. Turkey, Europe. Important pest of apple in Marmara region, Turkey.

Vespidae (hornets, yellow jackets)

Polistes chinensis (F.). Grape, apricot, other fruit. Iran. Adults feed on ripe fruit. Some importance.

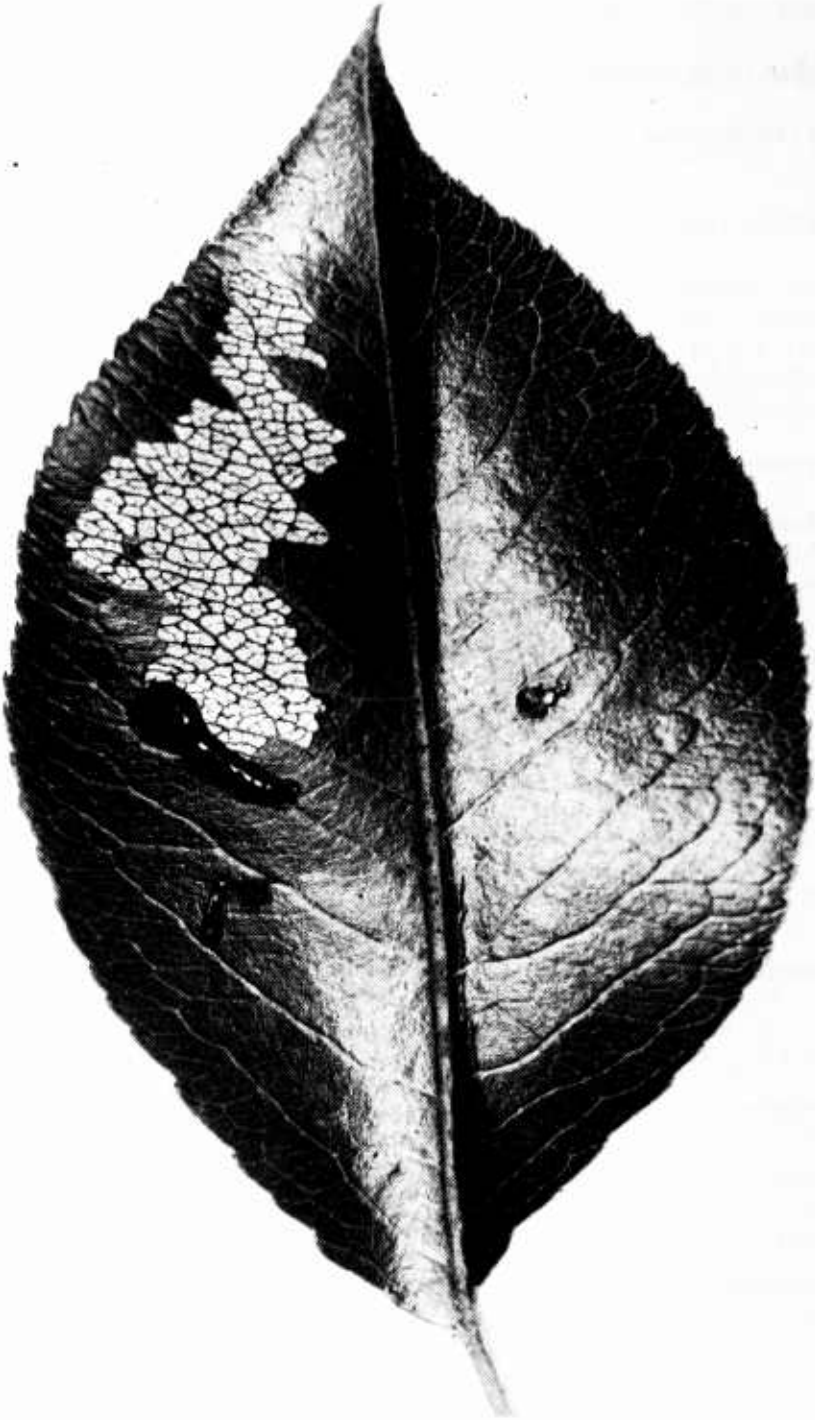

FIGURE 20.—*Caliroa cerasi* damage.

Polistes gallicus (L.). Deciduous fruit. Turkey, Iraq, Pakistan. Sometimes serious in Pakistan.

Vespa orientalis L. (See under Polyphagous Insects.)

Vespula germanica (F.). Ripe fruit including grape. Afghanistan,* Pakistan, Iraq, Iran. Adults feed on ripe fruit, honeydew of other insects. Some importance in Iran; sometimes serious in Pakistan.

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Apiomyia bergenstammi (Wachtl). Pear, hawthorn. Lebanon, Syria, Italy, Greece. Adults emerge from mid-April to mid-May; one generation a year. Buds changed to rounded or conical galls, terminal growth stopped. Very serious on pear in Lebanon; occasionally important in Syria.

Odinadiplosis amygdali (Anagn.). Peach, almond. Afghanistan (determined as probably this species),* Turkey, Greece. Observed causing severe damage to peach terminals in Afghanistan, produces stunting and rosetting of terminals through gall formation. Heavily parasitized by *Torymus* sp.*

Drosophilidae (vinegar flies)

Drosophila melanogaster Meig. Fig, apple, peach, banana, other fruit. Cyprus, Egypt, Lebanon,* other areas.

Tephritidae (=Trypetidae) (fruit flies)

Dacus cucurbitae Coq. (See under Cucurbit Insects.)

Dacus zonatus (Saund.), peach fruit fly. Peach, mango, guava, melons, other fruit. West Pakistan,* India. Most destructive fruit fly in Punjab, West Pakistan, up to 60-percent infestation of mango.

Rhagoletis cerasi (L.), European cherry fruit fly. Cherry major host, other *Prunus* species. Turkey, Iran, most of continental Europe, U.S.S.R. (Kazakhstan). One of most serious pests of cherry in Europe, 80- to 100-percent damage reported; serious in Turkey and Iran, 25-percent damage in areas of Turkey in 1962.

See also following species under Citrus Insects:

Ceratitis capitata (Wied.). (Fig. 21.)

Ceratitis quinaria (Bezzi)

Dacus dorsalis Hend.

CITRUS INSECTS

Principal host crops: Grapefruit (*Citrus paradissii*), lemon (*Citrus limonia*), orange (*Citrus sinensis*, *C. aurantium*, and varieties).

FIGURE 21.—*Ceratitis capitata* damage in peach.

Acarina

Eriophyidae (eriophyid mites)

Aceria sheldoni (Ewing), citrus bud mite. Citrus. Libya,* Tunisia,* Egypt, Turkey, Israel, Aden, Cyprus, Lebanon, other Mediterranean areas. Stunting and malformation of new growth and fruit commonly found in Tunisia. Major lemon pest in Tunisia and Cyprus; minor pest in Israel; economically important in Turkey.

Phyllocoptruta oleivorus (Ashm.), citrus rust mite. Citrus. Israel, Lebanon,* Iran, Turkey, Syria, Cyprus, east Africa, east Asia, many other areas. Major pest in Cyprus and Israel; important in Turkey; light to severe in Caspian area of Iran where it was reported as being probably most important citrus pest of 1958.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

See following species under Polyphagous Insects:

Brevipalpus californicus (Banks)

Brevipalpus obovatus Donn.

Brevipalpus phoenicis (G.)

Tetranychidae (spider mites)

Eutetranychus banksi (McG.). (E. W. Baker, U.S. Dept. Agr., stated *E. banksi* occurs in Western Hemisphere only. All African records of *E. banksi*=*E. orientalis.*)

Eutetranychus orientalis (Klein), (includes records for *E. banksi* (McG.)). Citrus most common, fig, walnut, pumpkin, castorbean, other plants. Iran,* Cyprus, Israel, Jordan, Afghanistan,* Aden, Ethiopia,* Sudan, Egypt,* Libya. Serious outbreaks on citrus in

Cyprus; heavy infestations observed on citrus in Ethiopia and Iran; collected on this crop in Afghanistan.

Panonychus citri (McG.), citrus red mite. Citrus. Iran, Lebanon, Libya, Turkey, east Asia, U.S.S.R., other areas. Abundant in areas of Iran; caused loss of yield in Turkey; minor pest in Libya.

See also following species under Polyphagous Insects:

Tetranychus cinnabarinus (Bdv.)

Tetranychus telarius (L.)

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Anacridium aegyptium (L.)

Oedipoda caerulescens (L.)

Schistocerca gregaria (Forsk.)

Isoptera

Rhinotermitidae (termites)

Reticulitermes lucifugus (Rossi), Mediterranean soil termite. Citrus. Turkey, Israel, Mediterranean region. Sometimes builds galleries in roots of young trees and in trunks of old ones.

Thysanoptera

Thripidae (thrips)

Heliothrips haemorrhoidalis (Bouché), greenhouse thrips. Citrus, azalea, many other plants. Egypt, Israel, Greece, Spain, in greenhouses and tropical and subtropical areas of world. Minor pest on citrus in Israel; locally important.

Odontothrips karnyi rivnayi Pries. Citrus, other plants. Israel. Injures citrus fruit.

Scirtothrips aurantii Faure, South African citrus thrips. Citrus, cotton, acacia, other plants. Egypt, Sudan, Somalia, southern Africa, Southern Rhodesia, Nyasaland. Attacks citrus fruit, reduces market value.

Taeniothrips discolor (Karny). Citrus, ornamentals, polyphagous. Egypt, Cyprus, Israel, Europe. Infests flowers, injures citrus fruit in Israel.

Taeniothrips frici (Uzel). Citrus, tea, plum. Iran. Some importance.

Taeniothrips meridionalis Pries. Citrus, other plants. Israel. Injures citrus fruit.

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Heteroptera

Coreidae (coreid bugs)

See following species under Polyphagous Insects:
Anoplocnemis curvipes F.
Leptoglossus membranaceus (F.)

Lygaeidae (lygaeid bugs)

Leptodemus minutus (Jak.). (See under Polyphagous Insects.)

Miridae (plant bugs)

Dionconotus cruentatus (Brullé), orange blossom bug. Citrus, grasses, other plants. Lebanon, Turkey, Syria, Cyprus, Israel, southern Europe. Occasionally important in Lebanon and Israel on citrus, causes blossom drop.

Pentatomidae (stink bugs)

See following species under Polyphagous Insects:
Agonoscelis pubescens (Thunb.)
Calidea bohemani (Stål)

Homoptera

Aleyrodidae (whiteflies)

Acaudaleyrodes citri (Pr. & H.). Citrus, pomegranate, *Zizyphus*, some other plants. Egypt, Israel, West Pakistan. Some local damage to citrus from leaf drop.

Aleurocanthus husanii Corb., Husain's whitefly. Citrus. West Pakistan, India. Serious damage in some areas.

Aleurocanthus spiniferus (Q.), orange spiny whitefly. Citrus, other plants including rose, grape, pear. West Pakistan, India, east Asia. Minor pest in West Pakistan; important in Japan and some other areas.

Aleurocanthus woglumi Ashby, citrus blackfly, oriental whitefly. Citrus primarily, mango, *Zizyphus*, coffee, other plants. West Pakistan,* Iran, Aden, Seychelles, areas of southern Asia, other areas. Heavy and widespread in West Pakistan. Important pest, seriously reduces yield. (Fig. 22.)

Aleurolobus citrifolii Corb. Citrus. West Pakistan, India. Some importance.

Aleurolobus marlatti (Q.), Marlatt whitefly. Citrus. Pakistan, Iran,* India, Japan. Minor pest.

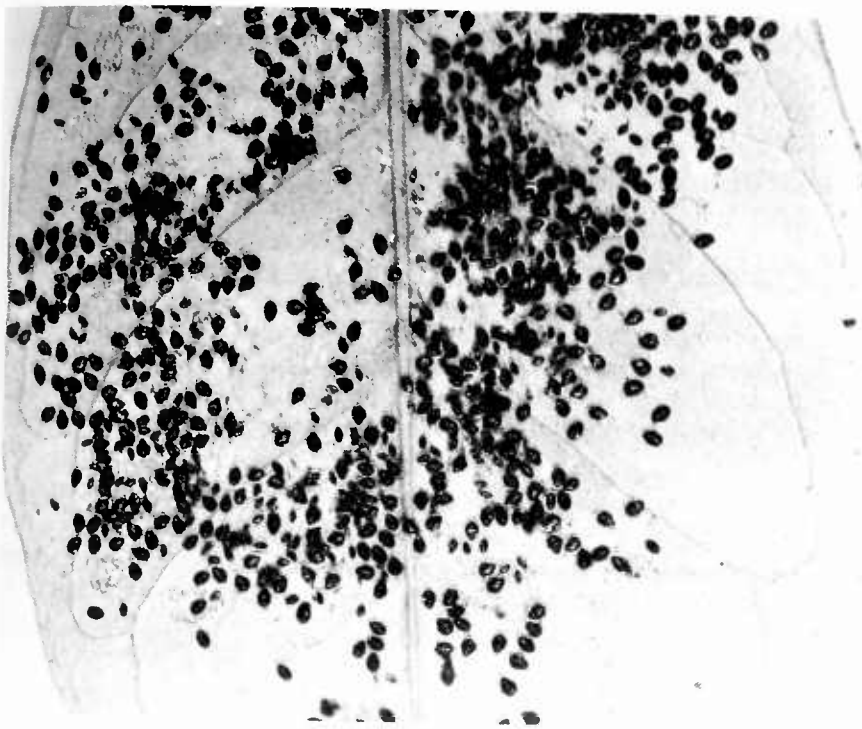

FIGURE 22.—*Aleurocanthus woglumi.*

Dialeurodes citri (Ashm.), citrus whitefly. Citrus. West Pakistan, Afghanistan,* other areas. Major pest in Afghanistan and West Pakistan.

Dialeurodes kirkaldyi (Kot.). (See under Insects Affecting Ornamentals.)

Dialeurolonga elongata (Doz.), elongate whitefly. Citrus. West Pakistan,* India. Found with very heavy infestation of citrus blackfly. Minor pest.

Trialeurodes ricini (Misra). Citrus, castorbean. Iran,* India. Heavy damage on castorbean.

Aphidae (aphids)

Toxoptera aurantii (Fonsc.), black citrus aphid. Citrus preferred, tea, coffee, wide host range. Turkey, Cyprus, Syria, Lebanon, Pakistan, Israel, Aden, Ethiopia,* Somalia, Egypt, Libya,* Tunisia,* many tropical and subtropical areas of world. May cause severe damage on young trees; serious damage some years in Libya; major pest in Pakistan.

Toxoptera citricidus (Kirk.), oriental black citrus aphid, brown citrus aphid, tropical citrus aphid. Citrus. Most of east Asia, Africa (Sudan,* Somalia, Ethiopia, generally south of Sahara), other areas. Feeds on new growth. Vector of devastating tristeza disease, causing heavy losses in South America and elsewhere; vector of stem pitting, lime dieback, citrus yellows.

Cicadellidae (leafhoppers)

See following species under Polyphagous Insects:

Empoasca decedens Paoli

Empoasca decipiens Paoli

Coccidae (soft scales)

Ceroplastes floridensis Comst., Florida wax scale. Citrus, polyphagous. Lebanon, Israel, Syria, Turkey, Cyprus, Egypt, widespread in tropical and subtropical regions. Important in Egypt; occasionally important in Lebanon and Israel; minor pest in Iran. Honeydew can cause problem.

Coccus sp. Citrus, coffee. Ethiopia.* Severe infestations seriously damaging these crops at Harrar in 1961.

Coccus pseudomagnoliarum (Kuw.), citricola scale. Citrus, evergreen plants. Iran, parts of U.S.S.R. Some importance in Iran.

Lecanium persicae (F.). (See under Insects Affecting Pome and Stone Fruits.)

Pulvinaria aurantii (Ckll.), orange pulvinaria scale. Citrus, *Pittosporum* sp. Iran, Cyprus, parts of U.S.S.R. Heavy infestations in some areas of Iran.

Pulvinaria floccifera (Westw.). Citrus, tea, polyphagous. Iran, Egypt, Turkey, Spain, Greece, other subtropical areas. About 15-percent damage reported from Black Sea coast, Turkey; sometimes severe near Caspian Sea, Iran.

See also following species under Polyphagous Insects:

Ceroplastes sinensis Del. G.

Coccus hesperidum L.

Coccus viridis (Green)

Pulvinaria psidii Mask.

Saissetia hemisphaerica (Targ.-Tozz.)

Saissetia oleae (Bern.)

Diaspididae (armored scales)

Aonidiella aurantii (Mask.), California red scale. Citrus, various deciduous fruit, other plants. Afghanistan, Lebanon,* Cyprus, Saudi Arabia, Aden, Pakistan, Iran, Israel, Syria, Turkey, Morocco, Ethiopia,* Egypt, southern Europe, widespread in tropical and subtropical areas. Attacks leaves, twigs, fruit, causes severe damage; 10-percent damage in Turkey; common in citrus orchards of Ethiopia. Major citrus pest, one of most important in semiarid, subtropical areas.

Aonidiella citrina (Coq.). Orange, *Prunus* sp. Afghanistan,* Iran, Aden, Ethiopia,* U.S.S.R. (Transcaucasia), India. Severe infestation recorded in Afghanistan and elsewhere.

Aonidiella orientalis (Newst.), oriental yellow scale. Citrus, guava, oleander, palms, castorbean. Iran, Pakistan, Iraq, Arabia, India, Ethiopia, Sudan,* Somalia, widespread in tropical and subtropical areas. Light to heavy infestations in Iran; injurious in Iraq; minor pest in Pakistan; only scale of importance in hot, arid southern regions of Iran in 1958.

Chrysomphalus aonidum (L.) (=*ficus* Ashm.), Florida red scale, Egyptian black scale, citrus black scale. Citrus, banana, palms, many other plants. Lebanon,* Israel, Ethiopia,* Algeria, Egypt, Sudan,* Syria, Pakistan, many other tropical and subtropical areas of world. Major citrus pest in Lebanon, Egypt, Israel; serious damage in Syria and other Mediterranean areas; common in Ethiopia on citrus; called most important pest of citrus in Israel and Egypt. (Fig. 23.)

Chrysomphalus dictyospermi (Morg.), dictyospermum scale, western red scale. Olive, citrus, fig, tea, shrubs, palms, many other trees. Ethiopia, Libya, Algeria, Morocco, Egypt, Tunisia,* Turkey, Iraq, Iran, U.S.S.R. (Transcaucasia), southern and eastern Asia, many other areas of world. One of most important citrus scales in Libya and Tunisia; dominant citrus pest in western Mediterranean area; destructive to citrus in Iran; apparently minor pest in Turkey.

Chrysomphalus pinnulifera (Mask.). Citrus. Iran, Turkey.

Lepidosaphes beckii (Newm.), purple scale, citrus mussel scale. Citrus, olive, croton, fig, many other plants. Ethiopia,* Somalia, Egypt, Libya, Tunisia,* Lebanon,* Turkey, Israel, Cyprus, Iran, Iraq, Syria, tropical and subtropical areas of world. Heavy damage on citrus in Iran; important pest in southern Europe, Israel, Libya; heavy infestations on citrus noted in Ethiopia. (Fig. 24.)

Lepidosaphes gloverii (Pack.), Glover scale, citrus long scale. Citrus preferred, many other plants. Iran, Turkey, Israel, Egypt, southern Europe, common in tropical and subtropical areas. Heavy infestations on citrus in Iran some years, but little importance; infests young trees in Turkey.

Parlatoria morrisoni McK., Morrison's parlatoria. Citrus, *Zizyphus*, jasmine, olive. Iran, Sudan,* Iraq.

Parlatoria pergandii Comst., chaff scale. Citrus main host, many plants attacked. Libya, Egypt, Lebanon, Iran, Israel, Turkey, Syria, Pakistan, Cyprus, widely distributed over world. Major citrus pest in Iran, minor in Israel and Turkey, important in Libya and Egypt.

Parlatoria proteus (Curt.). Citrus, peach, palms, many other plants. Iran, Egypt, Mediterranean basin, other tropical and subtropical areas of world. Not very important on citrus; troublesome on peach in Egypt.

Parlatoria zizyphus (Lucas), black parlatoria scale. Citrus preferred, few reports of pest on some other plants. Southern Europe, Asia (including Iran, Lebanon, Cyprus), parts of Africa (Morocco, Algeria, Egypt, Ethiopia,* Tunisia,* Libya, southern Africa), other areas. One of major pests of citrus in southern Europe, Tunisia, China; important in Iran, Libya, and Ethiopia; believed to be outstanding citrus pest in Eritrea (Ethiopia) in 1961. Difficult to control. (Fig. 25.)

FIGURE 23.—*Chrysomphalus aonidum.*

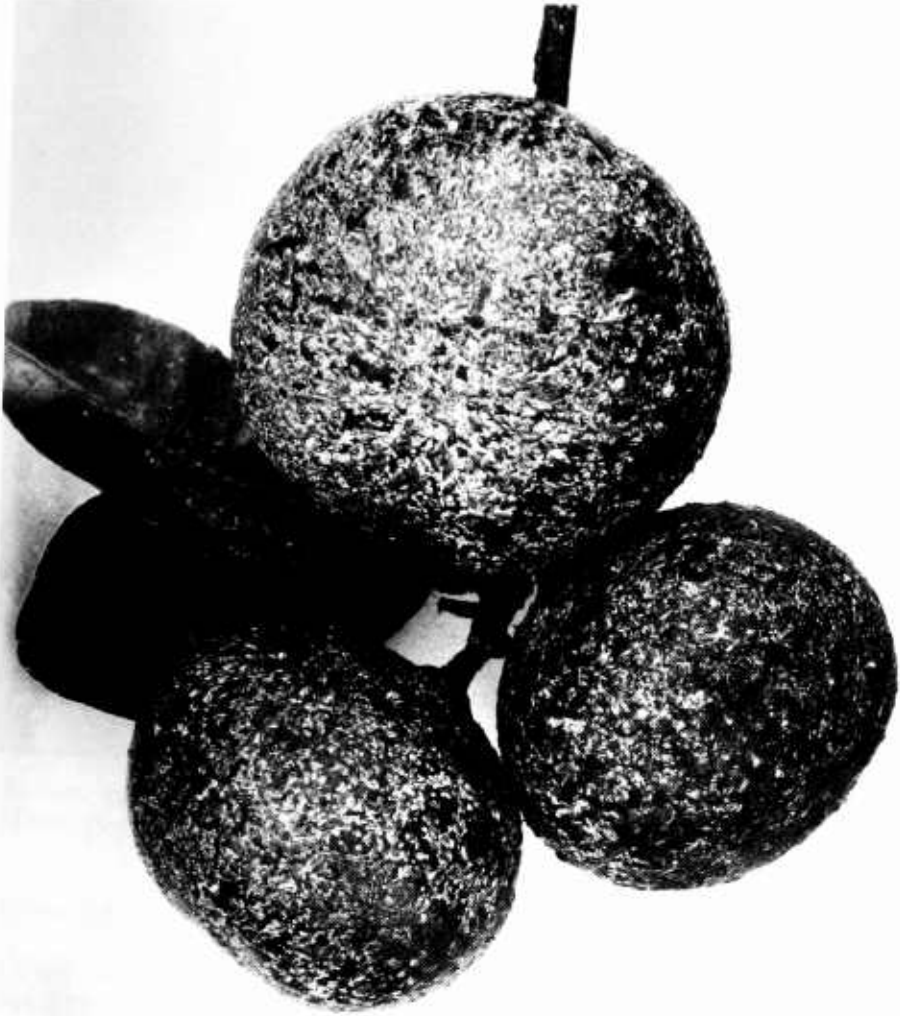

FIGURE 24.—*Lepidosaphes beckii.*

See also following species under Polyphagous Insects:

Aspidiotus camelliae Sign.
Aspidiotus hederae (Vall.)
Parlatoria cinerea Hadd.
Parlatoria oleae (Colv.)
Pinnaspis aspidistrae (Sign.)

Margarodidae (margarodid scales)

Icerya purchasi Mask., cottony-cushion scale, Australian fluted scale. Citrus, ornamentals, polyphagous. Egypt, Libya, Ethiopia, Tunisia,* Lebanon, Iran, Israel, Syria, Turkey, Cyprus, other tropical and subtropical areas of world. Damage from feeding and heavy exudation of honeydew. Controlled in many areas by *Rodolia cardinalis*. Devastating infestations observed in areas of Ethiopia where *R. cardinalis* not established.

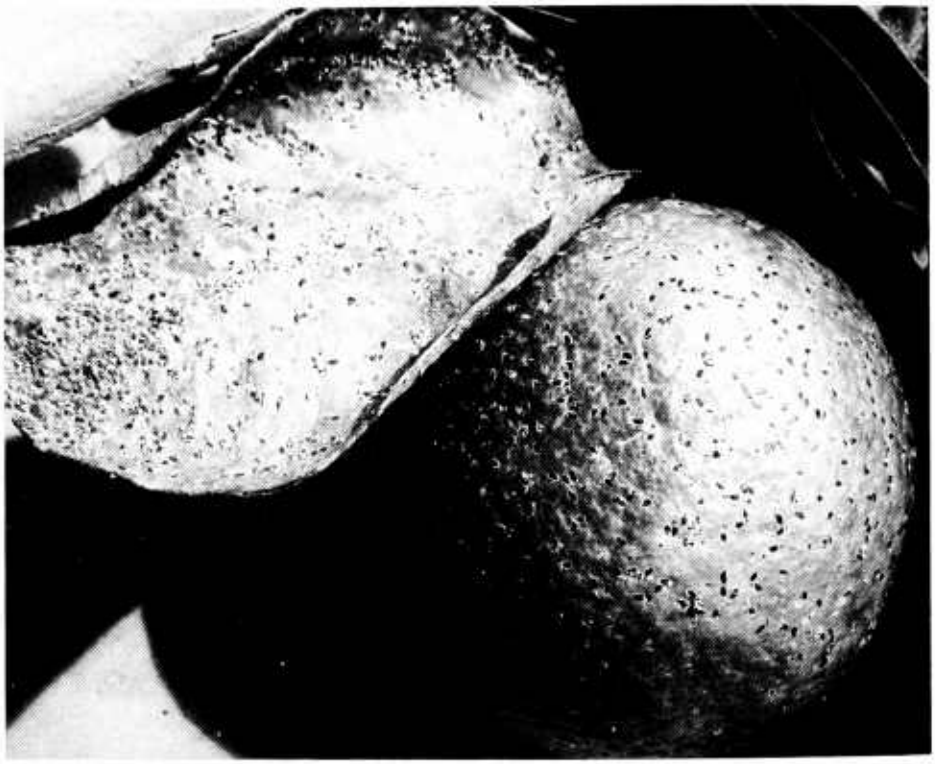

FIGURE 25.—*Parlatoria zizyphus.*

See also following species under Polyphagous Insects:
Drosicha stebbingi (Green)
Drosichiella tamarindus Green
Icerya aegyptiaca (Dougl.)

Ortheziidae (ensign scales)

Orthezia insignis Browne. (See under Polyphagous Insects.)

Pseudococcidae (mealybugs)

See following species under Polyphagous Insects:
Ferrisia virgata (Ckll.)
Nipaecoccus vastator (Mask.)
Phenacoccus hirsutus Green
Pseudococcus adonidum (L.)
Pseudococcus brevipes (Ckll.)
Pseudococcus comstocki (Kuw.)
Pseudococcus maritimus (Ehrh.)
Pseudococcus (Planococcus) citri (Risso)

Psyllidae (psyllids)

Diaphorina citri (Kuway.), citrus psylla. Citrus. Tropical and subtropical Asia including Afghanistan,* Pakistan, China, India. One of most important pests of citrus in India, feeds on new growth reducing yield; serious outbreaks in Pakistan and Afghanistan, up to 100 per leaf observed in Afghanistan.

Spanioza erythreae (Del Guer.). Citrus. Ethiopia,* Sudan, east and southern Africa. Damages new growth, nymphs cause pitting, more injury on young trees. Major pest in southern Africa.

Lepidoptera

Gelechiidae (gelechiid moths)

Psorosticha zizyphi (Staint.). Citrus. Pakistan,* India, Indonesia. (Larvae from West Pakistan determined as possibly this species.) Feeds on terminals, producing light web. Minor pest.

Hyponomeutidae (plutellid moths)

Prays citri Mill., citrus flower moth, rind borer. Citrus. Israel, Syria, other Mediterranean areas, southern Europe, India. Feeds mostly in flowers, causes webbing, may damage graft union on young trees. Minor pest in Israel.

Lycaenidae (blues, coppers, hairstreaks)

Virachola isocrates (F.). (See under Insects Affecting Miscellaneous Fruits.)

Lyonetiidae

Phyllocnistis citrella Staint., citrus leaf miner. Citrus principal host. Tropical Asia including Iran, Afghanistan, Iraq, Arabia, Pakistan. Attacks hamper growth in young orchards. Important in some areas of Iran, Pakistan, Saudi Arabia.

Noctuidae (=Phalaenidae) (owlet moths)

See following species under Insects Affecting Special Crops:

Achaea catella Gn.

Achaea janata (L.)

Olethreutidae (olethreutid moths)

Cryptophlebia leucotreta Meyr. (See under Polyphagous Insects.)

Papilionidae (swallowtail butterflies)

Papilio dardanus Brown. Citrus. Ethiopia, Uganda. Considerable damage to young trees.

Papilio demoleus L., lemon butterfly. Citrus, several other hosts. Africa across Arabia, Iran,* Pakistan* to China. (Pakistan specimens determined near or equal.) Sometimes destructive to citrus foliage.

Papilio demoleus demodocus Esp., citrus butterfly. Orange, other citrus. Ethiopia,* Somalia, southern Africa, southern Arabia. Heavy defoliation of young trees in Ethiopia.

Papilio machaon L. Citrus, carrot, fennel. Egypt, Libya, Tunisia, Israel, Turkey, Cyprus, Iran, Iraq, Europe. Feeds on young trees, not injurious in Israel; some importance on vegetables in Iran.

Phycitidae

Ephestia vapidella Mann., citrus stub moth. Citrus, carob. Israel, Egypt, other Mediterranean areas. Feeds on bark, especially damaging on young grafted stock.

See also following species under Polyphagous Insects:

Cryptoblabes gnidiella (Mill.)

Ectomyelois ceratoniae (Zell.)

Coleoptera

Buprestidae (flatheaded wood borers)

Sphenoptera kambyses Obenb. (See under Insects Affecting Pome and Stone Fruits.)

Cerambycidae (roundheaded wood borers)

Macrotoma palmata (F.). Citrus, acacia, willow, other plants. Somalia, Egypt. Serious damage to trunks.

Curculionidae (weevils)

Paralixus nubilosus (Boh.). Citrus. Turkey. Recorded as damaging.

Scarabaeidae (scarabs)

Epicometis hirta (Poda). Citrus, other fruit. Turkey, other Mediterranean areas. Feeds in blossoms.

See also following species under Polyphagous Insects:

Oxythyrea cinctella (Schaum)

Oxythyrea funesta (Poda)

Oxythyrea pantherina (Gory & Perch.)

Pachnoda interrupta (Ol.)

Tropinota squalida (Scop.)

Scolytidae (bark beetles)

Hypothenemus aspericollis (Woll.). (See under Insects Affecting Miscellaneous Fruits.)

Hymenoptera

Vespidae (hornets, yellow jackets)

Vespa orientalis L. (See under Polyphagous Insects.)

Diptera

Drosophilidae (vinegar flies)

Zaprionus vittiger Coq. Citrus, guava. Ethiopia,* Sudan,* Uganda.

Tephritidae (=Trypetidae) (fruit flies)

Ceratitis capitata (Wied.), Mediterranean fruit fly. Citrus, stone fruit, pepper, coffee, guava, many other fruits and vegetables. Egypt, Tunisia,* Libya, Ethiopia, Turkey, Israel, Lebanon,* Syria, Cyprus, Jordan, other Mediterranean and African areas, many tropical and subtropical regions. Most important citrus pest in many areas; most destructive pest in Lebanon; 25-percent damage in Turkey; up to 100-percent infestation of stone fruit in some Mediterranean areas; important pest of peppers in Libya. (Fig. 26.)

Ceratitis quinaria (Bezzi), Rhodesian fruit fly. Guava, apricot, citrus, some other fruit. Aden, Southern Rhodesia, Sudan, Nyasaland. Some importance in Rhodesia; serious pest of guava in Sudan; reported as seriously damaging citrus in Sudan.

Dacus dorsalis Hend., oriental fruit fly. Over 150 kinds of fruit and vegetables including citrus, banana, tomato, loquat, peach, pear. West Pakistan, India, southeast Asia. Regarded as most destructive pest of fruit in many areas; 50- to 80-percent infestations recorded in West Pakistan. Major pest.

See also following species under Cucurbit Insects:

Dacus ciliatus Loew

Dacus cucurbitae Coq.

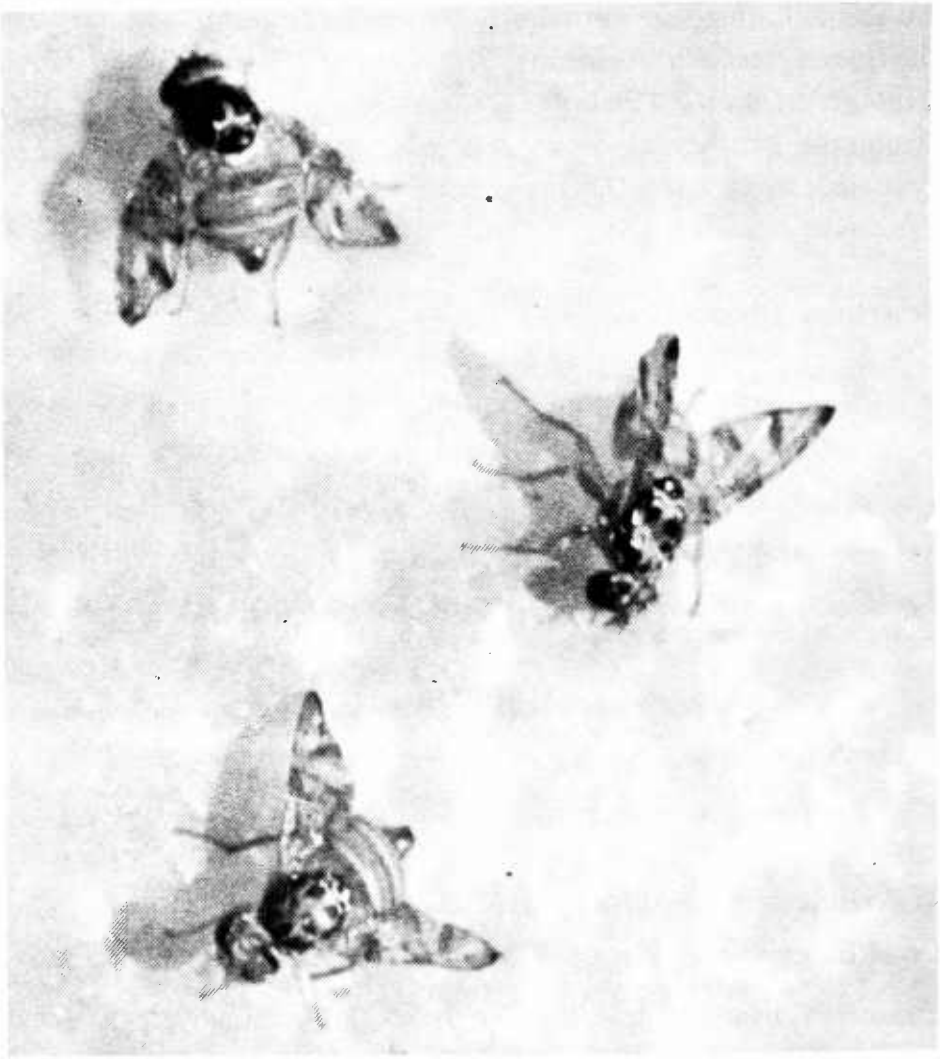

FIGURE 26.—*Ceratitis capitata.*

OLIVE INSECTS

Host crop: Olive (*Olea europaea*).

Acarina

Eriophyidae (eriophyid mites)

Aceria olea (Nal.). Olive. Cyprus, Israel, Italy, Greece. Up to 46-percent deformed fruit in Cyprus, causes leaf malformation.

Oxypleurites maxwelli Keif., olive leaf mite. Olive. Libya. Important in some areas.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus olearius Sayed. Olive. Egypt.

Thysanoptera

Phlaeothripidae (thrips)

Liothrips oleae (Costa), olive thrips. Olive. Libya, Tunisia, Israel, Syria, Ethiopia, southern Europe. Deforms foliage, attacks fruit and flowers. Some damage in Tunisia; minor pest in Libya.

Heteroptera

Lygaeidae (lygaeid bugs)

Leptodemus minutus (Jak.). (See under Polyphagous Insects.)

Miridae (plant bugs)

Calocoris rubrinervis (H.-S.). Olive trees. Turkey. Estimated 2-percent damage.

Homoptera

Aleyrodidae (whiteflies)

Aleurolobus olivinus (Silv.). Olive. Libya, Tunisia, Turkey, Cyprus, Italy, Greece. Minor pest.

Asterolecaniidae (pit scales)

Pollinia pollini (Costa). Olive. Libya, Egypt, Cyprus, Turkey, Jordan, Lebanon, Israel. Causes bark cracking. Serious pest in some areas of Libya; minor pest in Cyprus.

Coccidae (soft scales)

Filippia oleae (Costa). Olive. Libya, Turkey,* Lebanon, Israel, Greece. Heavy infestations on olive in some areas of Turkey; minor pest in Libya.

Saissetia oleae (Bern.). (See under Polyphagous Insects.)

Diaspididae (armored scales)

Chrysomphalus dictyospermi (Morg.). (See under Citrus Insects.)

Getulasphis bupleuri Marchal. Olive. Libya. Important pest in some areas of Libya.

Lepidosaphes beckii (Newm.). (See under Citrus Insects.)

Leucaspis riccae Targ.-Tozz. Olive. Egypt, Cyprus, Iran, southern Europe. Severe infestations on leaves and twigs in Egypt; minor pest in Cyprus and Iran.

Parlatoria morrisoni McK. (See under Citrus Insects.)

Saharaspis ceardi Bal. Olive. Libya. Minor pest locally.

See also following species under Polyphagous Insects:

Aspidiotus britannicus Newst.

Aspidiotus hederae (Vall.)

Parlatoria oleae (Colv.)

Selanaspidus articulatus (Morg.)

Issidae (issid planthoppers)

Hysteropterum flavescens (Ol.). Olive, grape, fig. Turkey, Israel, Greece. Attacks young shoots.

Psyllidae (psyllids)

Euphyllura olivina (Costa), olive psyllid. Olive. Tunisia,* Libya, Iran,* Turkey,* Cyprus, Israel, Lebanon, Syria, Greece. Feeds on shoots and flowers. Considerable damage in Turkey; serious in Syria; most damage in Libya in humid areas.

Lepidoptera

Cossidae (carpenterworm moths)

Zeuzera pyrina (L.). (See under Insects Affecting Pome and Stone Fruits.)

Hyponomeutidae (plutellid moths)

Prays oleellus (F.), olive moth. Olive. Egypt, Tunisia, Libya,* Turkey, Lebanon, Cyprus, Israel, Syria, Greece. Feeds on buds, young leaves, fruit. In areas of Turkey 40- to 60-percent bud damage, up to 27-percent fruit injury; damaging in Egypt; important pest in Cyprus.

Lyonetiidae

Oecophyllembius neglectus Silv. Olive. Libya. Important in some areas.

Olethreutidae (olethreutid moths)

Cryptophlebia leucotreta (Meyr.). (See under Polyphagous Insects.)

Phycitidae

Euzophera pinguis (Haw.). Olive. Turkey, north Africa, Spain.

Pyraustidae (pyraustid moths)

Palpita unionalis (Hbn.). Olive. Tunisia, Libya, Egypt, Lebanon, Cyprus, Israel, Turkey. Not important in Lebanon; may cause some damage in Tunisia and Libya, especially on young stock.

Sphingidae (sphinx moths)

Acherontia atropos (L.). (See under Polyphagous Insects.)

Tortricidae (leaf roller moths)

Cacaecimorpha pronubana (Hbn.). (See under Insects Affecting Pome and Stone Fruits.)

Coleoptera

Alleculidae

Omophlus propagatus Kirsch. (See under Grape Insects.)

Curculionidae (weevils)

Brachyrhinus (Otiorrhynchus) cribricollis (Gyll.). Olive. Tunisia, other north African areas, Turkey. Damages young trees in Tunisia.

Rhynchites (Coenorhinus) ruber (Fairm.), olive weevil. Olive, apple. Turkey, Cyprus, Lebanon, Greece. Causes estimated 15-percent damage to olive in Turkey; local importance in Cyprus and Lebanon.

Meloidae (blister beetles)

Zonabris (Mylabris) oleae Lap. Olive. Libya, Tunisia. Serious on young trees in Tunisia and areas of Libya.

Scolytidae (bark beetles)

Hylesinus oleiperda F., olive borer, olive shot-hole borer. Olive. Tunisia,* Libya,* Turkey, Syria, Israel, Greece. Very important pest in some areas of Tunisia and Libya. (Fig. 27.)

Lepersinus fraxini (Panz.). Olive, ash, other trees. Israel, Tunisia, Iran, Europe. Attacks weakened trees. Severe damage in Iran.

Phloeotribus caucasicus Reit. Olive. Cyprus. Heavy local damage to twigs.

Phloeotribus scarabaeoides (Bern.) (=*olea* F.). Olive. Tunisia, Algeria, Libya, Syria, Israel, Turkey, Lebanon, Cyprus, Iran, Greece. Adults destroy healthy twigs; four to five generations per year in north Africa. Sometimes important pest in Cyprus and Lebanon; serious damage in Syria and areas of north Africa; 15-percent damage in Turkey.

FIGURE 27.—*Hylesinus oleiperda* damage to olive tree.

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Dasyneura olea (Loew). Olive. Syria, Israel, Lebanon, Mediterranean area. Gall former on leaves. Common but minor pest.

Rhabdophaga oleiperda Del Guer. Olive (*Olea chrysophylla*). Ethiopia. Galls kill branches.

Thomasiniana oleisuga (Targ.-Tozz.). Olive. Libya, Turkey, Israel, Italy, Greece. Larvae under bark of 2-year-old branches in spring and summer; two generations a year. Minor pest locally in Libya; about 5-percent damage in Turkey.

Tephritidae (=Trypetidae) (fruit flies)

Dacus oleae (Gmel.), olive fly, olive fruit fly. Olive. Israel, Egypt, Lebanon,* Libya, Tunisia, Turkey, Cyprus, Syria, other Mediterranean areas, southern Africa, Ethiopia, U.S.S.R. (Caucasus). Four generations a year in Israel. From 20- to 30-percent loss of olives in Egypt and Turkey; most important olive pest in Lebanon; serious pest in Libya, Syria, Cyprus, Algeria. Major pest.

GRAPE INSECTS

Host crop: Grape (*Vitis vinifera*).

Acarina

Eriophyidae (eriophyid mites)

Eriophyes vitis (Pagst.), grape erineum mite. Grape. Iran, Lebanon, Syria, Cyprus, Greece, Turkey, Libya, Tunisia. Common in areas of Iran in 1958, minor damage; believed minor pest in Cyprus; some importance in Libya and Tunisia.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Tenuipalpus granati Sayed. Grape, pomegranate. Iran,* Egypt. Serious damage to leaves in Iran; apparently minor pest in Egypt.

See also following species under Polyphagous Insects:

Brevipalpus californicus (Banks)

Brevipalpus obovatus Donn.

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Orthoptera

Acrididae (grasshoppers)

See following species under Polyphagous Insects:

Locusta migratoria (L.)

Truxalis nasuta (L.)

Thysanoptera

Phlaeothripidae (thrips)

Cryptothrips brevicollis Bagn. Grape. Cyprus. Serious damage to leaves and fruit.

Thripidae (thrips)

Drepanothrips reuteri Uzel. (See under Crucifer Insects.)

Retithrips syriacus (Mayet). (See under Polyphagous Insects.)

Rhipiphorothrips cruentatus Hood, grapevine thrips. Grape. Pakistan, Afghanistan. Serious infestations reported from West Pakistan in 1957; important pest in Afghanistan.

Heteroptera

Lygaeidae (lygaeid bugs)

Nysius senecionis (Schill.). Grape. Tunisia,* Algeria, Egypt. Damages newly planted vines, migrating from weeds.

See also following species under Polyphagous Insects:

Nysius cymoides (Spin.)

Spilostethus pandurus (Scop.)

Miridae (plant bugs)

Deraeocoris punctulatus (Fall.). (See under Polyphagous Insects.)

Homoptera

Asterolecaniidae (pit scales)

Asterolecanium pustulans (Ckll.). (See under Polyphagous Insects.)

Chermidae (bark aphids)

Phylloxera vitifoliae (Fitch), grape phylloxera. *Vitis vinifera.* Tunisia, Israel, Jordan, Lebanon, Syria, Turkey, cosmopolitan. American origin. One of most destructive pests of 19th century after invading Europe about 1860; destroyed more than 2½ million acres of vineyards in France; about 20-percent loss still occurs in Turkey.

Cicadellidae (leafhoppers)

Macrosteles laevis (Ribaut). Grape. Afghanistan.

See also following species under Polyphagous Insects:

Empoasca decipiens Paoli

Empoasca lybica (Berg.)

Cicadidae (cicadas)

Cicadatra alhageos (Kol.) (=*viridissima* (Wlk.)). Grape. Lebanon, Syria. Reported as very serious pest in Syria.

Cicadatra glycyrrhizae Kol. Grape. Turkey. Lays eggs in shoots; nymphs feed on roots; life cycle reported as 6 years.

Coccidae (soft scales)

Ceroplastes sinensis Del G. (See under Polyphagous Insects.)

Lecanium persicae (F.). (See under Insects Affecting Pome and Stone Fruits.)

Pulvinaria betulae (L.) (=*vitis* L.). Grape, apricot. Iran, Turkey, parts of U.S.S.R.

Issidae (issid planthoppers)

Hysteropterum flavescens (Ol.). (See under Olive Insects.)

Pseudococcidae (mealybugs)

Rhizoecus falcifer Kunck., ground mealybug. Grape, palms, other plants. Turkey, Italy, France, Algeria. Lives on roots.

See also following species under Polyphagous Insects:

Nipaecoccus vastator (Mask.)

Phenacoccus hirsutus Green

Pseudococcus adonidum (L.)

Pseudococcus citri (Risso)

Pseudococcus maritimus (Ehrh.). (Fig. 28.)

Pseudococcus nipae (Mask.)

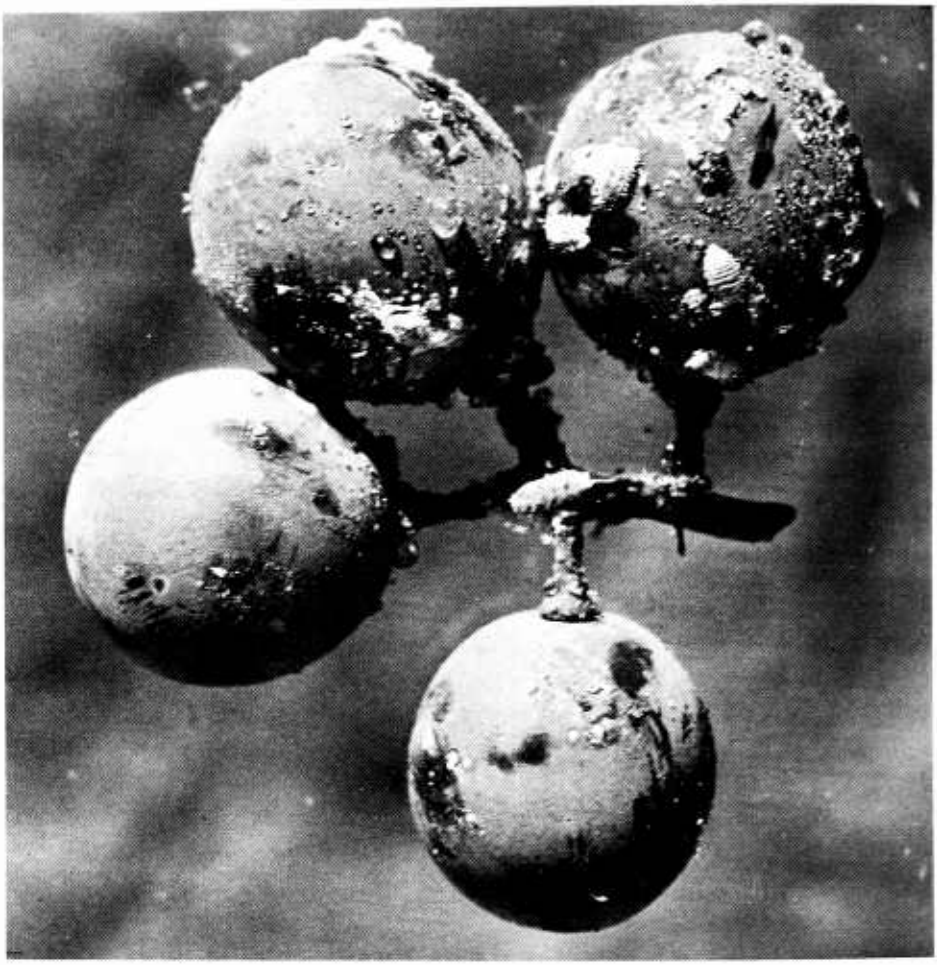

FIGURE 28.—*Pseudococcus maritimus* infesting grape.

Lepidoptera

Arctiidae (tiger moths)

Arctia villica (L.). Grape. Turkey, Tunisia. Considerable damage in Turkey in 1959.

Callimorpha plagiata (Wlk.). Vineyard. Afghanistan.* Adults collected on vines.

Heliozelidae (shield bearers)

Antispila rivillei Staint. Grape. Iran, Turkey, Egypt, other Mediterranean countries. Pest of grapevines in Mediterranean countries; important in Iran.

Coptodisca sp. Grape. Iran.* Heavy pupal population within leaves reported.

Noctuidae (=Phalaenidae) (owlet moths)

Agrotis herzogi Rebel. Grape. Libya, Egypt, Arabia, southwest Asia-northeast Africa. Minor pest in some areas of Libya.

Agrotis pronuba (L.). (See under Polyphagous Insects.)

Olethreutidae (olethreutid moths)

Lobesia botrana (Schiff.), vine moth. Primarily pest of grape, recorded from many hosts. Syria, Cyprus, Israel, Egypt, Turkey, Ethiopia, Lebanon, Iraq, Iran, Libya, parts of Europe. Feeds on flowers, young and mature fruit; may be three generations. Serious damage on grape in many parts of Europe and Asia; loss of up to one-third of vintage reported in Syria, Egypt, Israel, areas of U.S.S.R.

Phaloniidae

Clysiana ambiguella (Hbn.). Grape. Turkey, Egypt, Europe.

Phycitidae

Cryptoblabes gnidiella (Mill.). (See under Polyphagous Insects.)

Sphingidae (sphinx moths)

Acherontia styx Westw. (See under Polyphagous Insects.)

Berutana kotschyi (Koll.). Grape. Iraq.

Celerio lineata livornica (Esp.), striped hawkmoth. Grape, snapdragon, other plants. Cyprus, Iran, Lebanon, Iraq, Arabia, Syria, Tunisia, Libya,* Pakistan, Egypt, tropical and subtropical areas of Old and New Worlds. Not important in Lebanon and Iran; heavy damage at times in Iraq, Pakistan, Libya; attacks leaves and unripe fruit of grape.

Hippotion celerio (L.), vine hawkmoth. Grape, reported from cotton and sweetpotato. Lebanon, Iraq, Libya, Tunisia, Egypt, Israel, Old World tropical areas. Migratory. Not important pest in Lebanon; minor pest in Libya; heavy populations at times in Israel.

Pergesa elpenor (L.). Grape. Libya, Greece.

Proserpinus proserpina (Pall.). Grape. Lebanon. Not important.

Theretra alecto cretica (Bdv.). Grape. Lebanon, Iraq, Egypt, Iran, Asia tropical areas. Not important in Lebanon, but can cause damage.

Tortricidae (leaf roller moths)

Sparganothis pilleriana (Denis & Schiff.). Grape, tea. Iran, Turkey, Bulgaria. Feeds on leaves and fruit, webs leaves. Severe damage in some areas of Iran.

Zygaenidae (leaf skeletonizer moths)

Theresimima ampelophaga (Bayle), vine bud moth. Grape. Turkey, Cyprus, Israel, Syria, Lebanon, Libya, Europe. Feeds on buds and leaves. Considerable damage in Turkey and Cyprus; severe in Israel and Lebanon.

Coleoptera

Alleculidae

Omophlus propagatus Kirsch. Grape, olive. Cyprus. Serious damage to flowers.

Bostrichidae (false powder-post beetles)

Apate monacha F. (See under Polyphagous Insects.)

Apate terebrans Pall. Grape. Ethiopia, Kenya, Tanganyika.

Sinoxylon sexdentata (Ol.). Grape, fig, mulberry, other plants. Turkey, north Africa, southern Europe.

Buprestidae (flatheaded wood borers)

Melanophila cuspidata (Klug). (See under Nut Insects.)

Cerambycidae (roundheaded wood borers)

Chlorophorus varius Müll. (See under Insects Affecting Pome and Stone Fruits.)

Chrysomelidae (leaf beetles)

Altica sp. Grape. Ethiopia.* Heavy infestations.

Altica ampelophaga Guer. Grape. Tunisia, Egypt, Spain, Portugal, other European areas. Injurious in Spain, other areas.

Labidostomis decipiens (Fald.). Grape, tobacco. Cyprus, Egypt, Israel.

Curculionidae (weevils)

Eptacus arachniformis (Reit.). Grape. Lebanon. Reported as serious in Lebanon.

Pseudypera steineri Voss. Grape. Turkey.

Tanymecus palliatus (F.). (See under Insects Affecting Beets and Related Crops.)

Scarabaeidae (scarabs)

Anomala vitis (F.). Grape. Tunisia, Turkey, southern Europe. Apparently of some importance in Tunisia on grape.

Phaeadoretus comptus Méné. (See under Insects Affecting Pome and Stone Fruits.)

Polyphylla alba (Pall.). (See under Insects Affecting Pome and Stone Fruits.)

See also following species under Polyphagous Insects:

Anoxia pilosa (F.)

Oxythyrea cinctella (Schaum)

Pentodon bispinifrons Reit.

Polyphylla olivieri (Lap.)

Tropinota squalida (Scop.)

Tenebrionidae (darkling beetles)

Mesomorphus setosus (Muls. and Rey). Grape. Egypt.

Hymenoptera

Vespidae (hornets, yellow jackets)

Polistes chinensis (F.). (See under Insects Affecting Pome and Stone Fruits.)

Vespa orientalis L. (See under Polyphagous Insects.)

Vespula germanica (F.). (See under Insects Affecting Pome and Stone Fruits.)

DATE PALM INSECTS

Principal host crop: Date palm (*Phoenix dactylifera*) (other Palmaceae involved).

Acarina

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus phoenicis (G.). (See under Polyphagous Insects.)

Raoliella indica Hirst. Date palm, other palms. Egypt, [illegible] Sudan, Mauritius. Important pest on leaves.

Tetranychidae (spider mites)

Oligonychus afrasiaticus (McG.), Old World date mite. Date palm. Iran, Libya, Iraq, Algeria. Destroys crop some years in areas of Iran; important in areas of Libya.

Oligonychus pratensis (Banks), date palm mite. Date palm. Tunisia, other north African areas, Sudan, Iraq. Feeds on fruit and foliage. Light infestations reported in Sudan; serious in dry years in Iraq and Tunisia.

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

Zonocerus variegatus (L.). (See under Polyphagous Insects.)

Isoptera

Termitidae (termites)

Odontotermes (O.) sudanensis (Sjöst.). Date palm trees, peanut. Sudan.* Heavy infestation on date palms in areas of Sudan, up to 60 percent attacked in 1962; serious damage on peanut.

Homoptera

Asterolecaniidae (pit scales)

Asterolecanium phoenicis Ramachandra Rao. Date palm. Iran, Iraq, Israel. Some importance on leaves in Iran.

Coccidae (soft scales)

Eucalymnatus tessellatus (Sign.), tessellated scale. Palms, mango, some other plants. Egypt, north Africa, parts of Europe, widespread. Does not generally cause important damage.

Dactylopiidae (dactylopiid scales)

Phoenicococcus marlatti Ckll., red date scale. Date palm, other palms. Tunisia, Libya, Jordan, Israel, Iraq, Egypt, Iran, southern Europe. Infests leaf bases. No appreciable damage in northeast Africa-southwest Asia.

Diaspididae (armored scales)

Aonidiella orientalis (Newst.). (See under Citrus Insects.)

Parlatoria blanchardi (Targ.-Tozz.). Date palm, other palms. Saudi Arabia, Sudan,* Somalia, Libya, Iran, Afghanistan,* Tunisia, Iraq, Israel, Turkey, Egypt, other desert areas from India to Morocco.

Infests fruit stems mostly. Light to heavy populations in Iran; serious in Libya and Morocco; serious infestations reported from Northern Province, Sudan; light infestations observed in Afghanistan.

See also following species under Polyphagous Insects:

Aspidiotus camelliae Sign.

Aspidiotus cyanophylli Sign.

Aspidiotus destructor Sign.

Aspidiotus hederae (Vall.)

Fiorinia fioriniae (Targ.-Tozz.)

Pinnaspis aspidistrae (Sign.)

Selenaspidus articulatus (Morg.)

Issidae (issid planthoppers)

Asarcopas palmarum Horv. Date palm. Egypt. Feeds on tender growth. Apparently not damaging in Egypt.

Margarodidae (margarodid scales)

Icerya aegyptiaca (Dougl.). (See under Polyphagous Insects.)

Pseudaspidoproctus hyphaeniacus (Hall). Date palm. Libya. Apparently some importance.

Pseudococcidae (mealybugs)

See following species under Polyphagous Insects:

Pseudococcus adonidum (L.)

Pseudococcus brevipes (Ckll.)

Pseudococcus citri (Risso)

Pseudococcus nipae (Mask.)

Tropiduchidae

Ommatissus binotatus Fieb. Date palm. Iran, Iraq, Egypt, north Africa, Spain, southeast U.S.S.R. Severe damage reported from Iran; most damaging insect on date in Iraq in 1956, over 2 million trees treated there in 1957.

Lepidoptera

Hesperiidae (skippers)

Zophopetes dysmephila (Trimen). Ornamental palm, date palm. Ethiopia, Africa south of Sahara. Minor pest on date palm, feeds on leaves.

Lycaenidae (blues, coppers, hairstreaks)

Virachola livia (Klug). (See under Insects Affecting Miscellaneous Fruits.)

Momphidae

Batrachedra amydraula Meyr., lesser date moth. Date. Saudi Arabia, Iraq, Iran, Egypt, India, Libya, Aden. Infests young fruit.

Phycitidae

Ectomyelois ceratoniae (Zell). (See under Polyphagous Insects.)

Myelois phoenicis Durr. Date palm. North Africa, Iraq. Feeds on fruit.

Pyralidae (pyralid moths)

Arenipses sabella (Hmpsn.), greater date moth. Date. Iraq, Iran, Algeria, Libya, Egypt. Serious pest of date on tree and in storage.

Coleoptera

Bostrichidae (false powder-post beetles)

Apate monacha F. (See under Polyphagous Insects.)

Enneadesmus forficula (Fairm.). Palms. Libya.

Enneadesmus trispinosus (Ol.). Palms, tamarisk. Tunisia, Algeria, Egypt, Iraq. Bores into dead branches and leaves.

Phonapate frontalis (Fahr.). Date palm, tamarisk. Iraq, Arabia, Egypt, Libya, tropical Africa. Develops in dry leaf midribs of date palm.

Buprestidae (flatheaded wood borers)

Julodis caillaudi (Latr.). Date palm, sorghum. Sudan, Egypt, Ethiopia. Considerable damage to leaves of palms.

Cerambycidae (roundheaded wood borers)

Apatophysis barbara (Lucas). Date palm. Tunisia, Algeria.

Prionus (Polyarthron) pectinicornis fairmairei Pic. Date palm. Tunisia, Algeria.

Pseudophilus testaceus Gahan. Date palm. Iraq, Egypt.

Curculionidae (weevils)

Rhynchophorus ferrugineus (Ol.). Date palm, coconut palm. Iraq, West Pakistan, India, Ceylon. Common and injurious; most important pest on coconut in Ceylon.

Rhynchophorus phoenicis (F.). Date palm, other palms. Ethiopia, east Africa, other tropical African areas. Injurious in Ghana.

Nitidulidae (sap beetles). (See under Insects Affecting Stored Products.)

Scarabaeidae (scarabs)

Oryctes elegans Prell., date stem borer. Date palm. Iraq, Iran, Arabia. Damages fruit stems, severe in Iran.

Oryctes monoceros (Ol.). Date and coconut palms. Aden, east Africa. Larvae feed in trunks.

Oryctes rhinoceros (L.). Date and coconut palms, sugarcane. West Pakistan, Iraq, east Asia. Larvae bore in trunks. Common in West Pakistan. Important pest.

Scolytidae (bark beetles)

Coccotrypes dactyliperda (F.), date stone beetle. Date. Libya, Egypt, Israel, Cyprus, many other areas of world. Larvae develop in seed. Important in Libya.

Hymenoptera

Vespidae (hornets, yellow jackets)

Vespa orientalis L. (See under Polyphagous Insects.)

INSECTS AFFECTING MISCELLANEOUS FRUITS

Principal host crops: Fig (*Ficus carica*), mango (*Mangiferae indica*), pomegranate (*Punica granatum*).

Acarina

Eriophyidae (eriophyid mites)

Aceria granati (Can. & Mass.). Pomegranate. Cyprus, Israel, Mediterranean area. Requires controls some years.

Aceria mangiferae Sayed. Mango. Egypt. Kills terminal buds. Very injurious.

Vasates mangiferae Attiah. (Species apparently not same as *A. mangiferae* Sayed.) Mango. Egypt. Kills buds.

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Tenuipalpus granati Sayed. (See under Grape Insects.)

Tetranychidae (spider mites)

Eotetranychus hirsti Prit. & Bak. (=*Tetranychus fici* Hirst). Fig. West Pakistan. Infests leaves and fruit.

Eutetranychus orientalis (Klein). (See under Citrus Insects.)

Oligonychus mangiferus (Rahman & Sapra). (See under Cotton Insects.)

Thysanoptera

Thripidae (thrips)

Selenothrips rubrocinctus (Giard). (See under Polyphagous Insects.)

Heteroptera

Coreidae (coreid bugs)

Anoplocnemis curvipes F. (See under Polyphagous Insects.)

Miridae (plant bugs)

Helopeltis schoutedeni Reut. (See under Polyphagous Insects.)

Homoptera

Aleyrodidae (whiteflies)

Acaudaleyrodes alhagii (Pr. & H.). *Zizyphus*, legumes. Egypt, Iran.*

Bemisia afer (Pr. & H.). *Zizyphus*, *Ficus*. Egypt, Iran.*

Siphoninus finitimus Silv. (See under Insects Affecting Pome and Stone Fruits.)

Siphoninus granati Pr. & H. (See under Insects Affecting Pome and Stone Fruits.)

Aphidae (aphids)

Aphis punicae Pass., pomegranate aphid. Pomegranate, some other plants. Israel, Egypt, Iran, Lebanon, Turkey, Cyprus, Libya, Morocco, Tunisia, Iraq, parts of Europe and U.S.S.R. Damage from sooty mold and direct feeding. May be severe in Egypt.

Pentalonia nigronervosa Coq. Banana. Egypt, Israel, tropical areas, greenhouses in other areas. Leaves, shoots, underground parts. Vector of "bunchy top" virus in tropical regions.

Asterolecaniidae (pit scales)

Asterolecanium pustulans (Ckll.). (See under Polyphagous Insects.)

Cicadellidae (leafhoppers)

Idiocerus atkinsoni Leth., mango leafhopper. Mango. West Pakistan, India. Two generations a year. Serious damage from feeding on inflorescence and from honeydew; may destroy crop in India.

Idiocerus clypealis Leth. Mango. West Pakistan, India. Serious damage, can cause complete loss of crop.

Idiocerus niveosparsus Leth. Mango. Pakistan, India. Major pest of mango.

Coccidae (soft scales)

Ceroplastes africanus Green, African wax scale. Fig, tamarisk, acacia. Egypt, Libya. Populations can be heavy.

Ceroplastes rusci (L.), fig wax scale. *Ficus* spp. primarily, many plants. Lebanon,* Libya, Tunisia, Turkey, Syria, Ethiopia (specimens determined as possibly this species),* Iraq, Israel, Cyprus, Greece, Egypt, Jordan, Iran,* widely distributed in Mediterranean area; also reported from other areas but records often difficult to confirm. Severe injury to fig frequently occurs in Mediterranean area from feeding and honeydew, but populations fluctuate; most important pest of fig in Israel; severe damage in Iran; complete loss of fig crop reported from areas of Libya in 1962; reported as damaging to pistachio in Turkey. (Fig. 29.)

Coccus acuminatus (Sign.), mango shield scale. Mango, guava. Egypt, France, Ceylon. Produces heavy honeydew.

Coccus mangiferae (Green). Mango. Israel. May cause leaf fall in heavy infestations; produces large amounts of honeydew.

Eulecanium ficiphilum Borkh. Fig. Iran.

See also following species under Polyphagous Insects:

Ceroplastes sinensis Del G.

FIGURE 29.—*Ceroplastes rusci* infesting branches of *Ficus*.

Coccus hesperidum L.

Coccus viridis (Green)

Pulvinaria psidii Mask.

Saissetia hemisphaerica (Targ.-Tozz.)

Diaspididae (armored scales)

Africonidia africana (Newst.). Mango. Ethiopia.* Light infestations observed.

Aulacaspis tubercularis Newst. (=*A. cinnamomi* Newst.). Mango. Egypt, Kenya.

Chrysomphalus dictyospermi (Morg.). (See under Citrus Insects.)

Lepidosaphes ficus (Sign.), Mediterranean fig scale. Fig, apple, plum, other trees. Iraq, Egypt, Libya, Jordan, Israel, Lebanon, Iran. Important in areas of Libya and Iran.

Lepidosaphes tapleyi Wms. Mango. Sudan.* Attacks leaves. Requires controls in some areas.

Parlatoria pseudaspidiotus Ldgr. Mango, orchid. Sudan,* east Asia. Attacks leaves. Infestations required controls on mango in Sudan.

See also following species under Polyphagous Insects:

Aspidiotus cyanophylli Sign.

Aspidiotus destructor Sign.

Aspidiotus hederae (Vall.)

Aspidiotus lantaniae Sign.

Chrysomphalus personatus (Comst.)

Parlatoria cinerea Hadd.

Pinnaspis aspidistrae (Sign.)

Issidae (issid planthoppers)

Hysteropterum sp. Blackberry. Lebanon.* Heavy populations observed.

Hysteropterum flavescens (Ol.). (See under Olive Insects.)

Margarodidae (margarodid scales)

See following species under Polyphagous Insects:

Drosicha stebbingi (Green)

Drosichiella tamarindus Green

Icerya aegyptiaca (Dougl.)

Pseudococcidae (mealybugs)

See following species under Polyphagous Insects:

Pseudococcus adonium (L.)

Pseudococcus nipae (Mask.)

Psyllidae (psyllids)

Homotoma ficus (L.), fig psyllid. Fig. Tunisia, Libya, Lebanon, Syria, Iran, France, Greece, Italy, Algeria.

Trioza buxtoni Laing. Fig. Syria, Jordan. Produces galls on leaves. Damaging in Jordan.

Lepidoptera

Bombycidae (silkworm moths)

Trilocha ficicola (Westw.). Fig. Ethiopia.

Glyphipterygidae

Simaethis (Hemerophila) nemorana Hbn. Fig. Libya, Lebanon, Iraq, Turkey, Iran, Greece. Feeds on leaves, sometimes young fruit. Important pest in Libya and Iran.

Lycaenidae (blues, coppers, hairstreaks)

Tarucus theophrastus (F.), jujube butterfly. *Zizyphus* sp. Iraq. Feeding causes white patches on leaves.

Virachola isocrates (F.), copper butterfly. Pomegranate, guava, citrus. West Pakistan, India. Common important pest on pomegranate; minor pest on citrus.

Virachola livia (Klug), pomegranate butterfly. Pomegranate, date, loquat, acacia. Israel, Saudi Arabia, Lebanon, Syria, Egypt, Aden, Sudan, tropical Africa. As much as 70-percent infestation of pomegranate in Israel; serious damage in Lebanon, Syria, Egypt.

Lymantriidae (tussock moths)

Ocnerogyia amanda Staud., fig caterpillar. Fig. Iraq. Severe damage through defoliation.

Noctuidae (=Phalaenidae) (owlet moths)

Bombotelia jocosatrix (Gn.). Mango. West Pakistan. Minor pest.

See also following species under Polyphagous Insects:

Anua tirhaca (Cram.)

Parallelia algira (L.)

Phycitidae

Ectomyelois ceratoniae (Zell.). (See under Polyphagous Insects.)

Euzophera punicaella (Moore). Pomegranate, secondary pest in apple and pear. West Pakistan, central Asia. Attacks inner bark and fruit. As much as 30- to 80-percent loss on pomegranate in Baluchistan.

Tortricidae (leaf roller moths)

Cacaecimorpha pronubana (Hbn.). (See under Insects Affecting Pome and Stone Fruits.)

Coleoptera

Bostrichidae (false powder-post beetles)

Apate monacha F. (See under Polyphagous Insects.)

Sinoxylon sexdentata (Ol.). (See under Grape Insects.)

Buprestidae (flatheaded wood borers)

Anthaxia inculta (Germ.). Fig. Libya.

Cerambycidae (roundheaded wood borers)

Batocera rubus (L.). Mango. Jordan,* Lebanon.*

Batocera rufomaculata Deg., fig stem borer, tropical fig borer. Fig, mango. Pakistan, Jordan, Israel, India. Larvae bore into trunks. Destroyed over one-half of fig trees in Israel areas; serious damage in West Pakistan.

Hesperophanes fasciculatus Fald. Fig. Libya. Important in some areas.

Hesperophanes griseus (F.). Fig. Egypt, Cyprus, Mediterranean area. Larvae develop in trunks, common in old trees.

Chrysomelidae (leaf beetles)

Monolepta lepida Reiche. Avocado. Israel. Minor pest.

See also following species under Polyphagous Insects:

Aphthona latipennis Pic

Aphthona whitfieldi Bryant

Curculionidae (weevils)

Myllocerus undecimpustulatus Faust. (See under Polyphagous Insects.)

Sibinia planiuscula (Desbr.). (See under Cotton Insects.)

Nitidulidae. (See under Insects Affecting Stored Products.)

Scarabaeidae (scarabs)

Epicometis hirta Poda. (See under Polyphagous Insects.)

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Scolytidae (bark beetles)

Hypoborus ficus Er., fig shot-hole borer. Fig, loquat. Libya, Lebanon, Cyprus, Iran, Egypt, Israel, southern Europe. Important in some areas of Libya and Iran; not important in Lebanon.

Hypothenemus aspericollis (Woll.) (=*H. ehlersi* Eichh.). Fig, citrus, pistachio, other trees. Iran, U.S.S.R. Larvae attack inner bark of branches, cause some damage.

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Anjeerodiplosis peshawarensis Mani, fig midge. Fig. Pakistan, India. Adults appear in April. Serious pest in West Pakistan, attacking up to 25 percent of fruit; infested fruit becomes elongated, wrinkled, soft.

Drosophilidae (vinegar flies)

Drosophila melanogaster Meig. (See under Insects Affecting Pome and Stone Fruits.)

Gitona beckeri Duda. Fig. Cyprus.

Lonchaeidae

Silba virescens Macq. (=*Lonchaea aristella* Beck.), black fig fly. Fig. Tunisia, Libya, Lebanon, Syria, Turkey, Iraq, Egypt, Italy, France, Greece. Five or six generations per year in Turkey. Serious pest on fig in Lebanon and Libya; up to 50-percent infestation in Iraq; up to 25-percent loss in Turkey.

Tephritidae (=Trypetidae) (fruit flies)

Carpomyia incompleta (Beck.). *Zizyphus* fruit. Egypt, Sudan, Ethiopia, Italy, Libya, Greece.

Carpomyia vesuviana (A. Costa). *Zizyphus jujuba.* West Pakistan, India, Lebanon, Libya, southeastern Europe. Damaging major pest, causing severe losses in cultivated *Zizyphus.* Records on melons may be erroneous.

Dacus cucurbitae Coq. (See under Cucurbit Insects.)

Dacus zonatus (Saund.). (See under Insects Affecting Pome and Stone Fruits.)

NUT INSECTS

Principal host crops: Almond (see under Insects Affecting Pome and Stone Fruits), hazelnut (*Corylus avellana*), pistachio (*Pistacia vera* and *Pistacia* spp.), walnut (*Juglans* spp.).

Acarina

Eriophyidae (eriophyid mites)

Aceria erinea (Nal.), walnut blister mite. Walnut. Cyprus. Feeds on leaves. Not very important pest.

Aceria tristriatus (Nal.), walnut gall mite. Walnut. Iran,* Greece. Produces galls on leaves. Can cause severe damage.

Eriophyes pistaciae Nal. Pistachio. Iran. Causes severe deformation of flowers.

Phytoptus avellanae Nal., filbert bud mite. Hazelnut. Turkey, Cyprus, Europe. Causes galling of buds, up to 30 percent of buds destroyed in Turkey. Some reports question its seriousness.

Tetranychidae (spider mites)

Eutetranychus orientalis (Klein). (See under Citrus Insects.)

Thysanoptera

Phlaeothripidae (thrips)

Liothrips jakhontovi Kreits. Pistachio. Afghanistan, Iran, parts of U.S.S.R. Six to seven generations per year. Considerable damage to young growth and fruit.

Thripidae (thrips)

Retithrips syriacus (Mayet). (See under Polyphagous Insects.)

Thrips iranicus Yakhontov. Pistachio. Iran. Attacks male flowers and prevents adequate pollination. Medium to severe damage.

Thrips pistaciae Yakhontov. Pistachio. Iran. Attacks male flowers and prevents adequate pollination. Medium to severe damage.

Heteroptera

Pentatomidae (stink bugs)

Carpocoris pudicus (Poda). (See under Polyphagous Insects.)

Homoptera

Aphidae (aphids)

Baizongia pistaciae (L.). Pistachio. Lebanon, Jordan, Syria, Turkey, Iraq, Israel, Italy, Algeria. Gall former on leaves. Serious pest in Lebanon.

Chromaphis juglandicola (Kltb.), walnut aphid. Walnut. Israel, Iran, Iraq, Afghanistan,* Pakistan, Europe, north Africa, U.S.S.R. (Transcaucasia). Attacks underside of leaves, sooty mold develops. Some importance in Iran; minor pest in Pakistan.

Corylobium avellanae (Schrk.). Hazelnut. Turkey. Minor pest.

Forda sp. Pistachio. Iran.* Heavy populations observed.

Forda formicaria Heyden. (See under Cereal Insects.)

Forda riccobonii (Stef.). Pistachio, grasses. Libya, Israel, Syria, Turkey, Italy, Spain. Produces galls on edges of pistachio leaves.

Geoica utricularia (Pass.). Pistachio, grasses. Lebanon, Libya, other Mediterranean areas. Serious pest in Lebanon on pistachio, roots of graminaceous plants secondary host.

Geoica utricularia rungsi Rem. & Dav. Pistachio. Libya. Minor pest.

Panaphis juglandis (Goeze). Walnut. Lebanon,* Israel, Jordan, Cyprus, Greece, Turkey, Afghanistan,* Iran, Pakistan. Heavy infestations in Lebanon; some importance in Iran; minor pest in Pakistan; very light infestations observed in Afghanistan.

Slavum wertheimae H. R. L. Pistachio. Syria. Produces conspicuous green galls on young twigs.

Smynthurodes betae Westw. (See under Polyphagous Insects.)

Cicadellidae (leafhoppers)

Idiocerus alkani Wag. Pistachio. Turkey.

Idiocerus stali Fieb. Pistachio. Iran,* Turkey, Syria. Most damaging insect on pistachio in Iran, destroyed most fruit in Kazvin area before DDT; severe damage in Turkey, causing 15-percent loss. Heavily infested trees covered with honeydew.

Coccidae (soft scales)

Pulvinaria pistaciae Bod. Pistachio. Iran, Israel. Common pest in Iran, but damaging only in north.

Diaspididae (armored scales)

Epidiaspis gennadii Leon. Pistachio. Israel, Iran. Injurious in Israel; minor pest in Iran.

Lepidosaphes pistaciae Arkh. Pistachio. Iran, Turkey. Considerable damage in Turkey and Iran.

Lepidosaphes pistaciae f. ***pistacicola*** Borchs. Pistachio. Iran. Minor to medium attack on branches and trunks.

Leucaspis (Salicicola) pistaciae Ldgr. Pistachio. Lebanon,* Iran, Turkey. Severe damage on trunks and branches in Iran; heavy infestations in Lebanon.

Melanaspis inopinata (Leon.). (See under Polyphagous Insects.)

Salicicola davatchii Bal. & Kaus. Pistachio. Iran. Minor to medium damage on twigs and branches.

Pseudococcidae (mealybugs)

Pseudococcus maritimus (Ehrh.). (See under Polyphagous Insects.)

Psyllidae (psyllids)

Agonoscena targionii (Licht.), pistachio psyllid. Pistachio. Iran.* Attacks leaves and fruit. Important pest on pistachio in Iran.

Lepidoptera

Gelechiidae (gelechiid moths)

Schneidereria pistaciicola (Danil.). Pistachio. Iran, Afghanistan, U.S.S.R. (Uzbekistan area). Two to three generations per year. Bores into nuts. Abundant on young fruit in Iran; up to 40-percent loss in U.S.S.R.

Geometridae (geometrid moths)

Eupithecia dodoneata dubiosa Dietz. Pistachio. Lebanon. Not important.

Oulobophora externata (H.-S.). Pistachio. Lebanon. Not important.

Gracilariidae (leaf blotch miners)

Parornix avellanella (Staint.). Hazelnut. Turkey. Minor pest.

Lasiocampidae (tent caterpillar moths)

Pachypasa otus (Drury), pistachio silkworm. Pistachio, oak, other trees. Turkey, Lebanon, Syria, Israel, Iran, Iraq, Greece. Feeds at night. Important on pistachio in Turkey and Syria.

Lymantriidae (tussock moths)

Euproctis karghalica Moore. Pistachio. Iran. Feeds on leaves.

Ocneria terebynthina Staud. Pistachio. Iran,* Iraq. Severe leaf skeletonizer in Iran.

Lyonetiidae

Leucoptera scitella (Zell.). (See under Insects Affecting Pome and Stone Fruits.)

Nepticulidae

Nepticula promissa Staud. Pistachio. Iran, Israel. Leaf miner of some importance, may cause heavy damage at times.

Noctuidae (=Phalaenidae) (owlet moths)

Anua tirhaca (Cram.). (See under Polyphagous Insects.)

Eutelia adulatrix (Hbn.). Pistachio. Lebanon, Tunisia, Egypt, Europe into Asia. Not important in Lebanon and Tunisia.

Olethreutidae (olethreutid moths)

Carpocapsa pomonella (L.). (See under Insects Affecting Pome and Stone Fruits.)

Cryptophlebia leucotreta (Meyr.). (See under Polyphagous Insects.)

Gypsonoma dealbana (Froel.). Hazelnut. Turkey. Destroys leaf buds. Usually no importance, but can cause serious damage.

Thaumetopoeidae

Thaumetopoea processionea (L.). Pistachio, oak. Iran, Europe. Larvae feed on leaves, can cause severe damage.

Thaumetopoea solitaria (Frey.). Pistachio. Iran, Lebanon, Israel, Iraq, Turkey, Cyprus. Larvae congregate in forks of branches; one generation per year. Defoliator. Severe leaf feeder in Iran.

Coleoptera

Buprestidae (flatheaded wood borers)

Agrilus viridicaerulans ssp. ***esfandiarii*** Oben. Pistachio. Iran. Some importance on twigs and fruit peduncles.

Anthaxia ephippiata Redt. Pistachio. Iran. Importance unknown.

Anthaxia judinae Step. Pistachio. Iran. Larvae tunnel through branches, attack inner bark. Some importance.

Capnodis cariosa Pall., pistachio borer. Pistachio. Lebanon,* Iran, Syria, Turkey, Israel, Italy, Greece, southern U.S.S.R. Larvae bore into roots; adults active from May through summer; 2- to 3-year life cycle. Destroys trees in Syria and Iran.

Capnodis cariosa hauseri (Oben.). Pistachio. Iran. Larvae attack roots and sometimes trunk just above soil surface. Minor to medium importance.

Capnodis cariosa iranica Bog. Pistachio, probably other trees. Iran. Larvae attacks roots, causing economic damage.

Capnodis parumstriata Ball. Pistachio, almond, other fruit. Iran, Pakistan. Larvae attack woody parts of pistachio; adults chew leaf petioles on almond. Minor to medium damage in Iran; major pest in Pakistan.

Melanophila cuspidata (Klug) (=*jakovlevi* Sem.). Pistachio, juniper, fig, poplar. Iran, Egypt, Syria, Algeria, Italy, Greece. Larvae bore into trunk. Importance unknown in Iran.

See also following species under Insects Affecting Pome and Stone Fruits:

Capnodis anthracina (Fisch.)

Capnodis carbonaria Klug

Cerambycidae (roundheaded wood borers)

Batocera horsfieldi Hope. Walnut. West Pakistan. Bores into wood. Serious pest in Punjab.

Hesperophanes sericeus (F.). Pistachio, almond, fig, oak. Israel, Iran, Cyprus. Lives in dead wood. Minor pest.

Oberea linearis (L.). Hazelnut. Turkey, Greece. Bores beneath bark, causing breaking of branches.

See also following species under Insects Affecting Pome and Stone Fruits:

Aeolesthes holosericea (F.)

Aeolesthes sarta (Solsky)

Cerambyx dux (Fald.)

Chrysomelidae (leaf beetles)

Altica quercetorum Foudr. Hazelnut. Turkey. Minor pest.

Aphthona whitfieldi Bryant. (See under Polyphagous Insects.)

Curculionidae (weevils)

Alcidodes porrectirostris (Mshl.). Walnut. West Pakistan, India. Larvae bore in nuts. Common pest seriously damaging fruit.

Anoplus plantaris (Naezen). Hazelnut. Turkey. Feeds on young growth.

Curculio elephas (Gyll.), chestnut weevil. Chestnut, acorn. Algeria, Lebanon, Cyprus, southern and middle Europe. One of most serious pests of chestnut in Europe; as much as 70-percent damage in Bulgaria.

Curculio glandium Marsh. Hazelnut, acorn. Turkey, Greece, U.S.S.R. Damaging pest.

Curculio nucum L., hazelnut borer. Hazelnut, chestnut. Turkey, Europe. Most damaging insect of hazelnut crop in Turkey, 10- to 30-percent loss each year.

Lasiorhynchites syriacus (Desbr.) (var. ***kindermani*** (Desbr.) and ***apicalis*** Voss). Pistachio. Lebanon.† Medium infestations of adults observed on leaves.

Scolytidae (bark beetles)

Anisandrus dispar (F.). Hazelnut, walnut, fruit, oak, other trees. Turkey, Europe into Siberia, north Africa. Attacks mostly weakened stems. Severe damage in Turkey, up to 80 percent of branches may be attacked.

Carphoborus (Estenoborus) perrisi (Chap.), lesser pistachio bark beetle. Pistachio. Syria, Iran. Economic status apparently not established.

Chaetoptelius vestitus (Muls. & Rey), pistachio bark beetle. Pistachio. Iran,* Syria, Turkey, Israel, north Africa, southern Europe. Damages twigs, buds, trunks. Serious pest in Syria; important in Iran.

Hypothenemus aspericollis (Woll.). (See under Insects Affecting Miscellaneous Fruits.)

Hymenoptera

Eurytomidae (eurytomids, seed chalcids)

Eurytoma plotnikovi Nikolskaya. Pistachio. Iran,* Turkey, Greece. Adults begin emerging early May; apparently one generation. Serious pest in Iran, 50-percent loss some years.

Torymidae (torymids)

Megastigmus pistaciae Wlk. Pistachio. Iran,* Turkey, Afghanistan. Adults active in summer; two generations. Feeds in nuts. Serious pest in Iran.

INSECTS AFFECTING BEETS AND RELATED CROPS

Principal host crops: Chard (*Beta vulgaris* var. *cicla*), garden beet and sugarbeet (*Beta vulgaris*), spinach (*Spinacia oleracea*).

Orthoptera

Gryllidae (crickets)

Tartarogryllus burdigalensis (Latr.). (See under Polyphagous Insects.)

Tettigoniidae (longhorn grasshoppers)

Tettigonia viridissima (L.). (See under Polyphagous Insects.)

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips clarisetis Pries. (See under Polyphagous Insects.)

Thripidae (thrips)

Hercinothrips sp. Chard. Ethiopia.* Undescribed species damages leaves of chard.

Thrips tabaci Lind. (See under Polyphagous Insects.)

Heteroptera

Miridae (plant bugs)

Calocoris norvegicus (Gmel.). (See under Insects Affecting Forage Legumes.)

Lygus pratensis (L.). (See under Polyphagous Insects.)

Lygus rugulipennis Popp. (See under Polyphagous Insects.)

Piesmatidae

Piesma quadratum (Fieb.), beet bug. Beets, spinach, mangel, other Chenopodiaceae, many other plants. Europe, Tunisia. Vector of leaf crinkle virus disease of sugarbeet, which causes more damage to this crop in parts of Europe than all other insects and diseases combined.

Homoptera

Aphidae (aphids)

Aphis fabae Scop. (See under Insects Affecting Edible Legumes.)

Cicadellidae (leafhoppers)

Circulifer opacipennis (Leth.). Beets, sesame, many other cultivated and wild plants. Cyprus, Israel, Jordan, Lebanon, Iran,* Afghanistan, Saudi Arabia, Syria, Turkey, U.S.S.R., Europe, north Africa including Tunisia and Libya. Vector of curly top of beet in Turkey; severe on sesame in Iran in 1958, destroying some fields.

Circulifer tenellus (Baker), beet leafhopper. Beets, tomato, cucurbits, spinach, other plants. Israel, Tunisia, Libya, Algeria, Morocco, Egypt, Sudan, Italy, Spain. Vector of curly top of beet in North America.

See also following species under Polyphagous Insects:

Empoasca decedens Paoli

Empoasca decipiens Paoli

Lepidoptera

Arctiidae (tiger moths)

Ocnogyna loewi (Zell.). Beets, other plants. Jordan, Egypt, Turkey, Greece, Israel, Syria, Iraq. Larvae damage foliage, make tent on host in early instars; one generation per year in Israel.

Gelechiidae (gelechiid moths)

Gnorimoschema ocellatella (Boyd), beet moth. Beets. Turkey, Iran,* Israel, Jordan, Libya, Egypt, Morocco, other Mediterranean areas. Damages leaves and roots. Important in Iran, up to 100-percent infestation in outbreaks; apparently minor pest in Turkey.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Phlogophora meticulosa L. Beets, lettuce. Jordan, Libya, Egypt.

See also following species under Polyphagous Insects:

Agrotis pronuba (L.)

Autographa gamma (L.)

Euxoa conspicua (Hbn.)

Euxoa segetum (Denis & Schiff.)

Euxoa spinifera (Hbn.)

Heliothis dipsacea (L.)

Prodenia litura (F.)

Spodoptera exigua (Hbn.)

Trichoplusia ni (Hbn.)

Nymphalidae (brush-footed butterflies)

Vanessa cardui (L.). (See under Polyphagous Insects.)

Pyraustidae (pyraustid moths)

Hymenia recurvalis (F.), Hawaiian beet webworm, beet webworm. Beets preferred, other plants. Cyprus, Iraq, Israel, Syria, Lebanon, Somalia, Sudan, eastern and southern Africa. Large numbers may cause severe defoliation.

Loxostege nudalis (Hbn.). Beets, castorbean. Libya,* Sudan, Iraq, Turkey, Cyprus, Egypt. Feeds on leaves. Damaging in Iraq.

Coleoptera

Alleculidae

Omophlus caucasius Kirsch. Beets. Turkey. Recorded as pest.

Chrysomelidae (leaf beetles)

Alledoya seraphina (Méné.). Beets. Turkey. Minor pest.

Cassida vittata Vill., tortoise beet beetle. Beets, chard. Turkey, Egypt, Libya, Israel, other Mediterranean areas. Larvae and adults cause defoliation; two to four generations. Minor pest in Turkey; more important in southern countries of Mediterranean region.

Chaetocnema sp. *Amaranthus* sp. Iran.* Heavy populations reported.

Chaetocnema tibialis (Ill.), beet flea beetle. Beets, related plants. Iraq, Iran, Egypt, Turkey, Israel, parts of Europe. Damage caused mainly by adults feeding on leaves. Damaging pest, severe in Iran; important in parts of Europe.

Chaetocnema tibialis breviuscula (Fald.). Beets, tobacco. Iran, eastern Europe. Larvae feed on roots; adults attack young plants, skeletonizing leaves. Rated severe pest in Iran.

Psylliodes elliptica Alld. (See under Cereal Insects.)

Coccinellidae (lady beetles)

Subcoccinella vigintiquatuorpunctata (L.). (See under Insects Affecting Forage Legumes.)

Curculionidae (weevils)

Brachyrhinus (Otiorrhynchus) ligustici (L.), alfalfa snout beetle. Beets. Turkey, Greece. Reported as pest.

Cleonus (Bothynoderes) punctiventris farinosus Fahr. Beets. Turkey. Economic infestations reported.

Cleonus (Bothynoderes) punctiventris punctiventris Germ., beet weevil. Primarily pest of beets, reported from many other crops. Turkey, middle and southern Europe. Serious on sugarbeet, often destroying young plantings.

Cleonus (Chromoderus) fasciatus Müll. Beets. Turkey, Europe. Minor pest in Turkey.

Cleonus (Conorhynchus) sp. Chard. Libya.* Heavy infestation noted.

Cleonus (Conorhynchus) nigrivittis Pall. Beets. Turkey. Recorded as pest.

Cleonus (Temnorhinus) kirghisicus Chevr. Beets. Turkey. Minor pest.

Lixus ascanii (L.). Beets. Israel, Bulgaria, Libya, Egypt, Cyprus, Greece.

Lixus cardui Ol. Beets. Iran, U.S.S.R. (Caucasus), Europe. Larvae attack leaf petioles. Medium to severe pest.

Lixus elongatus Goeze var. ***rufitarsis*** Boh. Beets. Tunisia.

Lixus incanescens Boh. Beets. Iran. Larvae cause medium to severe damage to petioles.

Lixus iridis Ol. Beets. Israel, Jordan. Recorded as pest.

Lixus junci Boh. Beets most important cultivated host, attacks many plants, but breeding reported to take place only on Chenopodiaceae. Generally distributed in Mediterranean region including Israel, Egypt, Libya, Jordan, Cyprus. May have two generations in Israel. Adults and larvae of major importance on sugarbeet, as much as 50-percent loss in Israel.

Lixus linearis Ol. Beets. Israel, Egypt, Jordan. Heavy populations develop at times. Major pest in Jordan.

Lixus subtilis Boh. Beets. Turkey, Iran. Larvae pest in leaf petioles in Turkey and Iran.

Tanymecus palliatus (F.). Beets, grape. Turkey, eastern Europe. Chief pest of beets in Rumania.

See also following species under Polyphagous Insects:

Tanymecus dilaticollis Gyll.

Tanymecus indicus Faust

Elateridae (wireworms)

See following species under Polyphagous Insects:

Agriotes lineatus (L.)

Agriotes pilosus (Panz.)

Meloidae (blister beetles)

Epicauta erythrocephala Pall. (See under Polyphagous Insects.)

Mylabris calida Pall. Beets. Iran. Adults damage flowers.

Scarabaeidae (scarabs)

Phyllopertha lineata (F.). Beets. Turkey, southern U.S.S.R., southern and eastern Europe.

See also following species under Polyphagous Insects:

Pentodon idiota (Hbst.)

Polyphylla olivieri (Lap.)

Tenebrionidae (darkling beetles)

Gonocephalum pusillum (F.). Beets, cotton. Turkey, Iran, U.S.S.R. Minor pest in Iran.

Pedinus strabonis Seidl. Beets. Turkey. Minor pest.

Hymenoptera

Tenthredinidae (sawflies)

Athalia colibri (Christ). (See under Crucifer Insects.)

Diptera

Anthomyiidae (leaf miner flies)

Pegomya hyoscyami (Panz.), spinach leaf miner. Beets, spinach, other Chenopodiaceae. Iran,* Cyprus, Jordan, Israel, Egypt, Turkey, Libya, Europe. May cause severe damage to seedlings. Injurious in many areas of Iran and Jordan; controls not warranted in Israel.

Bibionidae (march flies)

Bibio hortulans (L.). (See under Polyphagous Insects.)

Scatopsidae

Scatopse fuscipes Meig. Beets. Iran.* Damages roots.

Tipulidae (crane flies)

Tipula oleracea L.

CRUCIFER INSECTS

Principal host crops: *Brassica* spp. including cabbage, cauliflower, mustard.

Collembola

Entomobryidae (springtails)

Entomobrya purpurascens Pack. Cabbage. Ethiopia.* Heavy populations reported in Ethiopia.

Orthoptera

Acrididae (Locustidae) (grasshoppers)

Chrotogonus trachypterus robertsi Kirby. (See under Polyphagous Insects.)

Gryllidae (crickets)

Gryllus bimaculatus DeG. (See under Polyphagous Insects.)

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips clarisetis Pries. (See under Polyphagous Insects.)

Thripidae (thrips)

Drepanothrips reuteri Uzel. Cabbage, grape. Libya. Minor pest locally.

See also following species under Polyphagous Insects:

Thrips angusticeps (Uzel)

Thrips tabaci Lind.

Heteroptera

Lygaeidae (lygaeid bugs)

Nysius cymoides (Spin.). (See under Polyphagous Insects.)

Miridae (plant bugs)

See following species under Polyphagous Insects:

Deraeocoris punctulatus (Fall.)

Lygus gemellatus (H.-S.)

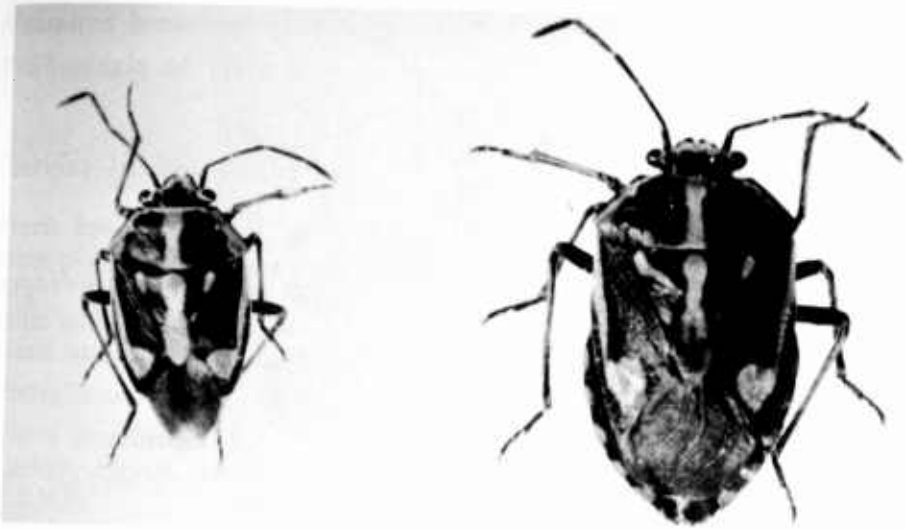

FIGURE 30.—*Bagrada cruciferarum* adults. Note difference in size.

Pentatomidae (stink bugs)

Bagrada hilaris Burm. f. ***cruciferarum*** Kirk. (=*picta* (F.)). Crucifers, cowpea, sugarcane. West Pakistan,* Iraq, India, Egypt, Sudan, east Africa. Major pest on cauliflower seedlings and mustard in West Pakistan, sometimes requiring controls; reported to feed on sugarcane in West Pakistan. (Fig. 30.)

Eurydema oleraceum (L.), cabbage bug. Crucifers, other plants. Turkey, Europe into Asiatic U.S.S.R. Common pest of crucifers. Destructive in some areas of Europe.

Eurydema ornata (L.) (=*festivum* (L.)). Cabbage, other crucifers, cotton, potato, cereals. Ethiopia,* Iran,* Lebanon,* Cyprus, Israel, Syria, Afghanistan,* Egypt, Turkey, Europe, north Africa, U.S.S.R. (Transcaucasia). Heavy populations observed in Afghanistan; light damage reported from Ethiopia; important pest over wide areas. (Fig. 31.)

Eurydema pulchrum (West.). Crucifers, (collected from alfalfa in Afghanistan, but may have been mixed with wild mustard). Afghanistan,* east Asia to Philippines.

Eurydema rugulosum Dhrm. Crucifers. Lebanon, Syria. Occasionally important.

Eurydema ventrale Kol. Cabbage. Iran,* Europe. Some damage reported from Iran in 1958.

Holcostethus sphacelatus (F.). Turnip. Iran.*

See also following species under Polyphagous Insects:

Carpocoris pudicus (Poda)

Carpocoris purpureipennis (DeG.)

FIGURE 31.—*Eurydema ornata* adult.

Homoptera

Aphidae (aphids)

Brevicoryne brassicae (L.), cabbage aphid. Crucifers. Iran,* Libya,* Aden, Afghanistan,* Saudi Arabia, Ethiopia,* Israel, Egypt, Sudan,* Turkey, Iraq, Cyprus, Lebanon, Syria, cosmopolitan. Injurious to crucifers during cooler months, often causing heavy damage in Iran, Libya, other areas.

Hyadaphis pseudobrassicae (Davis) (=*Lipaphis erysimi* (Kltb.)), (formerly in genus *Rhopalosiphum*), turnip aphid. Mustard, other crucifers. Iran,* India, Egypt, Iraq, Israel, Libya,* Europe, Africa, widespread. Heavy on turnip in areas of Iran in 1958.

Lepidoptera

Hyponomeutidae (plutellid moths)

Plutella maculipennis (Curt.), diamondback moth. Crucifers. Egypt, Iraq, Iran,* Turkey, Ethiopia,* Cyprus, Israel, Arabia, Libya.* Pakistan, Lebanon, Syria, Afghanistan, cosmopolitan. Important pest in Egypt Delta, Lebanon, Iraq, Iran, Afghanistan, other areas.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Agrotis sp. Cabbage. Ethiopia.* Very heavy damage to transplants and heads observed.

See also following species under Polyphagous Insects:

Diachrysia orichalcea (F.)

Euxoa conspicua (Hbn.)

Euxoa segetum (Denis & Schiff.)

Mamestra brassicae (L.)

Trichoplusia ni (Hbn.)

Pieridae (whites, sulfur butterflies)

Pieris brassicae (L.), large white butterfly. Crucifers preferred, other plants. Iran,* Lebanon, Israel, Pakistan, Iraq, Syria, Jordan, Afghanistan,* Cyprus, Turkey, Tunisia, Libya,* Ethiopia.* Sporadic outbreaks cause serious losses; serious damage to crucifers in Israel and Pakistan.

Pieris brassicoides Guer. Crucifers. Ethiopia. Damaging.

Pieris daplidice (L.). Cabbage, other crucifers. Libya, Tunisia, Turkey, Egypt, Europe into U.S.S.R. (Siberia). Some injury in U.S.S.R.

Pieris napi (L.), green-veined white. Cabbage, other crucifers. Iran, Tunisia, Turkey. Larvae feed on leaves. Some economic importance.

Pieris rapae (L.), small white butterfly, imported cabbageworm. Crucifers. Iran,* Libya, Afghanistan,* Iraq, Lebanon, Tunisia, Syria, Cyprus, Israel, Jordan, Pakistan, Turkey, Egypt, widespread in north Africa, Europe, eastward through Asia. Successive broods in Iraq. Damaging in Iran and Pakistan.

Pyraustidae (pyraustid moths)

Crocidolomia binotalis Zell., cabbage moth. Crucifers, some other plants. Somalia, Sudan, southern Africa, Pakistan to Australia. Injurious in Somalia; may occur in severe outbreaks, but rarely causes severe damage in Sudan; minor pest in Pakistan and India.

Hellula undalis (F.), oriental cabbage webworm, cabbage stemborer. Turnip, cabbage, other crucifers. Arabia, Cyprus, Israel, Iran,* Egypt, Libya,* Iraq, Turkey, Pakistan, India, Somalia, Sudan, southern Europe, widespread. Larvae bore into stems and heads. Damaging in Iran, Israel, Libya, Sudan, Egypt. Important pest, sometimes causes serious injury.

Udea ferrugalis (Hbn.). Cabbage, lettuce. Sudan.

Coleoptera

Chrysomelidae (leaf beetles)

Colaphellus hoefti (Méné.). Cultivated and wild crucifers. Iran, southern U.S.S.R. Extensive damage to foliage in Iran some years.

Entomoscelis berytensis Reiche. Crucifers. Jordan, Israel. Minor pest.

Galeruca sp. Turnip. Iran.* Medium populations observed.

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Phyllotreta sp. near ***armoraciae*** (Koch). Cabbage. Iran.* Very heavy infestations reported.

Phyllotreta atra (F.) (=*punctulata* (Marsh.)). Cabbage, other crucifers, sometimes on beets and other plants. Iran, north Africa, Europe. Adults feed on leaves; larvae attack roots and germinating seeds. Severe infestations on crucifers.

Phyllotreta cheiranthi Weise. Crucifers, cotton, alfalfa, other plants. Sudan, Egypt, east Africa, Ceylon. Adults feed on leaves. Major pest on crucifer seedlings in Sudan, may destroy entire crops; minor pest on cotton.

Phyllotreta cruciferae (Goeze), garden flea beetle, cabbage flea beetle. Crucifers preferred, beets, other vegetables. Lebanon, Syria, Jordan, Israel, Egypt, Iraq, Iran, Cyprus, Europe into U.S.S.R. (Siberia). Larvae feed on roots. Adults very serious in Lebanon; damaging in Iraq and Israel, especially on young plants.

Phyllotreta mashonana Jac. Cabbage, other crucifers. Ethiopia,† Kenya, Uganda. Heavy infestations observed in Ethiopia.

Phyllotreta sisymbrii Weise. Crucifers. Libya.

Phyllotreta tenuimarginata Jac. Crucifers, cotton. Sudan, Somalia. Food plants not known with certainty.

Phyllotreta undulata Kutsch. Crucifers. Iran, Turkey, Europe into U.S.S.R. (Siberia). Severe damage in Iran and other areas.

Phyllotreta weisei Jac. Crucifers, cotton, alfalfa. Sudan. Apparently of minor importance only on crucifers.

Curculionidae (weevils)

Baris coerulescens (Scop.). Crucifers. Libya, other north African areas, Europe into U.S.S.R. Minor pest locally in Libya, but important in U.S.S.R.

Lixus anguinus (L.). Crucifers, adults may be found on other plants. Libya, Egypt, Israel, Europe, U.S.S.R. (Caucasus). Larvae bore into stems, as much as 30-percent stalk breakage in seed plants. Minor pest in some areas of Libya; common in Israel.

Lixus latro Mshl. Crucifers. Ethiopia. Feeds in stalks and leaves. Up to 66-percent infestation in Eritrea.

Elateridae (wireworms)

Agriotes meticulosus Cand. (See under Polyphagous Insects.)

Scarabaeidae (scarabs)

Oxythyrea funesta (Poda). (See under Polyphagous Insects.)

Hymenoptera

Tenthredinidae (sawflies)

Athalia sp. Cabbage. Ethiopia.* Medium infestation observed.

Athalia colibri (Christ), turnip sawfly, beet sawfly. Crucifers, beets, carrot, flax, grape. Iran,* Turkey, Morocco, Europe through Asia. Important on crucifers in many parts of Europe, causing heavy defoliation; some importance in Iran.

Diptera

Anthomyiidae

Hylemya brassicae (Bouché), cabbage maggot, cabbage root fly. *Brassica* spp., other crucifers. Israel, Turkey, Europe into Asiatic U.S.S.R.; Libya,* Tunisia. Apparently of little importance in northeast Africa-southwest Asia.

Tipulidae (crane flies)

Tipula oleracea L. (See under Polyphagous Insects.)

CUCURBIT INSECTS

Principal host crops: Cucumber (*Cucumis sativus*), melon (*Cucumis melo*), squash (*Cucurbita* spp.), watermelon (*Citrullus vulgaris*).

Acarina

Tetranychidae (spider mites)

Tetranychus sp. probably ***kanzawai*** Kishida. Melons. Afghanistan.* Light infestation observed.

See also following species under Polyphagous Insects:

Tetranychus atlanticus McG.

Tetranychus telarius (L.)

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Oedipoda miniata (Pall.)

Thisoicetrus littoralis (Ramb.)

Gryllidae (crickets)

See following species under Polyphagous Insects:
Gryllus bimaculatus DeG.
Tartarogryllus burdigalensis (Latr.)

Tettigoniidae (longhorn grasshoppers)

Decticus annaelisae Ramme. (See under Polyphagous Insects.)

Heteroptera

Coreidae (coreid bugs)

Leptoglossus membranaceus (F.). (See under Polyphagous Insects.)

Miridae (plant bugs)

Campylomma diversicornis Reut. (See under Polyphagous Insects.)

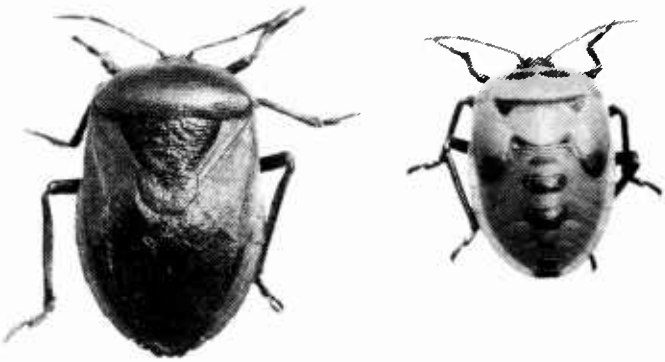

FIGURE 32.—*Coridius janus* adult (left) and nymph (right).

Pentatomidae (stink bugs)

Agonoscelis pubescens (Thunb.). (See under Polyphagous Insects.)

Coridius janus (F.). Cucurbits, eggplant, beans. West Pakistan,* India, Ceylon. Major pest in West Pakistan, very heavy populations observed in Karachi area. (Fig. 32.)

Coridius viduatus (F.), black melon bug. Melons, other cucurbits. Syria, Turkey, Sudan,* Iran, Egypt, Ethiopia, other African areas. Adults and nymphs feed on leaves, stems, fruit. May cause loss of early melon crop in Sudan; minor pest in Iran.

Homoptera

Aleyrodidae (whiteflies)

See following species under Polyphagous Insects:

Bemisia tabaci (Genn.)

Trialeurodes vaporariorum (Westw.)

Aphidae (aphids)

Aphis craccivora Koch. (See under Insects Affecting Forage Legumes.)

Aphis gossypii Glov. (See under Polyphagous Insects.) (Fig. 33.)

FIGURE 33.—*Aphis gossypii* damage to melon leaves.

Capitophorus elaeagni (Del Guer.). (See under Insects Affecting Miscellaneous Vegetables.)

Cicadellidae (leafhoppers)

Circulifer tenellus (Baker). (See under Insects Affecting Beets and Related Crops.)

See also following species under Polyphagous Insects:

Empoasca decipiens Paoli

Erythroneura asiatica Kusn.

Lepidoptera

Arctiidae (tiger moths)

Pericallia ricini (F.). (See under Polyphagous Insects.)

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

See following species under Polyphagous Insects:

Diachrysia orichalcea (F.)

Euxoa conspicua (Hbn.)

Heliothis nubigera H.-S.

Nymphalidae (brush-footed butterflies)

Vanessa cardui (L.). (See under Polyphagous Insects.)

Pyraustidae (pyraustid moths)

Diaphania indica (Saund.), pumpkin caterpillar. Cucurbits, other hosts. Southern Asia (including Saudi Arabia) to Australia, Sudan into central and southern Africa. Reported as important pest of cucurbits in Indian region.

Sphingidae (sphinx moths)

Acherontia styx Westw. (See under Polyphagous Insects.)

Coleoptera

Cerambycidae (roundheaded wood borers)

Apomecyna sp. Gourd. Ethiopia.* As many as 200 larvae per vine observed in stems of gourd.

Apomecyna binubila Pasc., melon stem borer. Cucurbits. Sudan, southern Africa. Larvae may occur in large numbers, sometimes cause serious damage.

Pseudoalbana lameeri Pic. Watermelon. Egypt. Attacks stems.

Chrysomelidae (leaf beetles)

Aphthona whitfieldi Bryant. (See under Polyphagous Insects.)

Asbecesta transversa Alld. Cucurbits. Aden.

Lamprocopa kunowi (Weise). Cucurbits. Somalia, Kenya, Uganda.

Raphidopalpa sp. Cucumber. Afghanistan.* Observed attacking young plants.

Raphidopalpa foveicollis (Lucas), red pumpkin beetle. Melons, beans, legumes. Pakistan, Lebanon,* Cyprus, Afghanistan,* Turkey, Iraq, Greece, Israel, Egypt, Yemen,* Somalia, Iran, Sudan,* India. Adults damage leaves, flowers, fruit; larvae roots; two to four generations in Israel. Causes severe damage to early melons in Iraq; serious pest in Pakistan and Afghanistan; 12-percent damage in Turkey. (Fig. 34.)

FIGURE 34.—*Raphidopalpa foveicollis* adult.

Coccinellidae (lady beetles)

Epilachna chrysomelina (F.), 12-spotted melon beetle. Principally pest of cucurbits, some other crops. Libya,* Tunisia,* Saudi Arabia, Aden, Iran,* Sudan,* Iraq, Ethiopia,* Somalia, Afghanistan,* Israel, West Pakistan,* Turkey, Cyprus, widespread in Africa, southern Europe, Middle East. Five generations in Israel. Major pest of cucurbits in Egypt and Libya; 10-percent damage in Turkey; heavy damage in several other areas.

Epilachna sparsa (Hbst.) (=*dodecastigma* Muls.). Cucurbits, tomato, eggplant, other Solanaceae. West Pakistan, Afghanistan, India, Ceylon. Up to 50-percent fruit loss on melons reported in some areas of Afghanistan; recorded as minor pest in West Pakistan.

Curculionidae (weevils)

Baris granulipennis (Tourn.). Watermelon, muskmelon, cucumber. Afghanistan (determined as probably this species),* Egypt, Israel, Iran, U.S.S.R. Large numbers in fruit in Egypt on occasion; about 10-percent infestation observed in Afghanistan; also important in Israel.

Baris traegardhi Auriv., melon weevil. Cucurbits. Sudan. Larvae feed in pulp of fruit. Damage can be important in Sudan.

Meloidae (blister beetles)

Lydoceras flavosellata Fairm. Cucurbits, other plants. Somalia, east Africa.

Mylabris flavoguttata Reiche. (See under Insects Affecting Solanaceous Crops.)

See also following species under Polyphagous Insects:

Epicauta albovittata Gestro

Epicauta erythrocephala Pall.

Scarabaeidae (scarabs)

See following species under Polyphagous Insects:

Oxythyrea cinctella (Schaum)

Pentodon idiota (Hbst.)

Tenebrionidae (darkling beetles)

Opatriodes punctulatus Brullé. (See under Polyphagous Insects.)

Diptera

Agromyzidae (leaf miner flies)

Liriomyza bryoniae Kltb., melon leaf miner. Cucurbits preferred, other plants. Israel, parts of U.S.S.R. Recently has become so abundant on melons in Israel that controls are necessary.

Phytobia sp. Melons. Iran. Severe leaf miner.

Lonchaeidae

Silba laevis (Bezzi). Cucurbits, tomato. Ethiopia, Kenya. Found in fallen fruit of cucurbits.

Tephritidae (=Trypetidae) (fruit flies)

Dacus bivittatus cucumarius Sack. Cucurbits, tomato, papaya. East Africa, Ethiopia, other African countries. Damaging to melons in some areas.

Dacus ciliatus Loew (=*brevistylus* Bezzi), lesser pumpkin fly, melon fruit fly. Melons preferred, citrus, tomato, beans. Egypt, Ethiopia, Somalia, Sudan, many other African areas, Pakistan, Aden, Arabia. Causes citrus fruit drop and serious damage to melons. Major pest in Pakistan.

Dacus cucurbitae Coq., melon fly, melon fruit fly. Cucurbits, citrus, mango, beans, tomato, stone fruit, many other plants. Afghanistan,* Pakistan,* eastward to northern Australia, also reported from east Africa. Severe infestations observed in cucurbits in eastern Afghanistan and West Pakistan. Major pest in much of its range. (Fig. 35.)

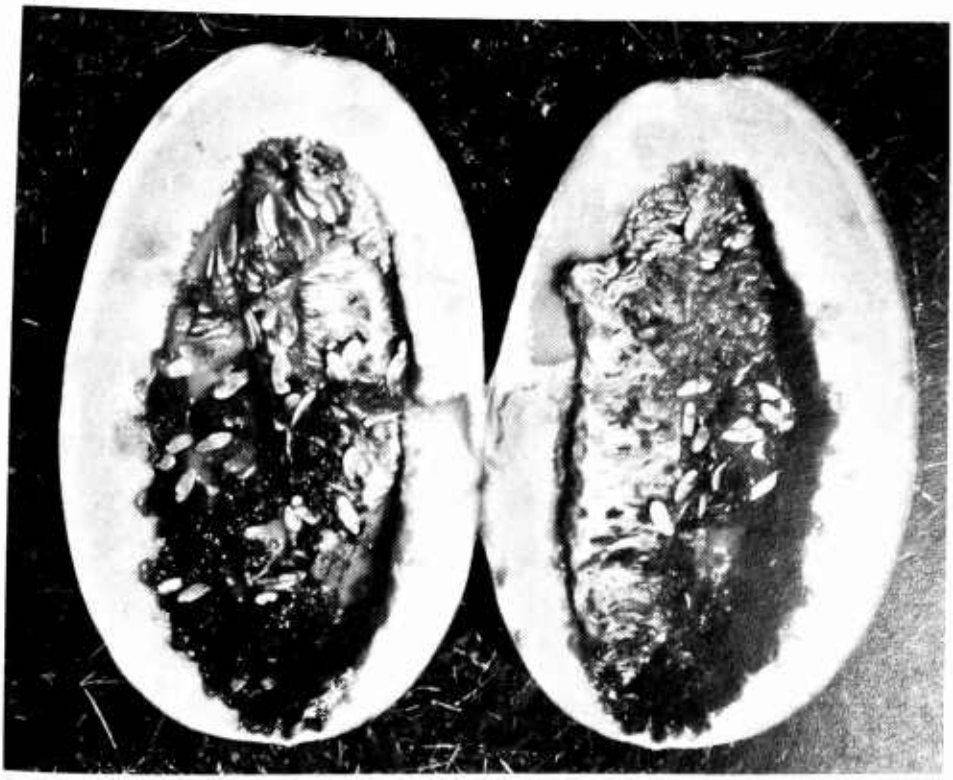

FIGURE 35.—*Dacus cucurbitae* damage in melon.

Dacus vertebratus Bezzi. Cucurbits, other vegetables, fruit. Sudan, Ethiopia, other areas of Africa. May cause important damage in fruit of cucurbits.

Dacus zonatus (Saund.). (See under Insects Affecting Pome and Stone Fruits.)

Myiopardalis pardalina (Bigot), Baluchistan melon fly (also called melon fly). Cucurbits, particularly watermelon, cucumber, muskmelon. India, Pakistan, U.S.S.R. (Caucasus), Iran,* Turkey, Lebanon, Israel, Iraq, Syria, Saudi Arabia, Egypt, Cyprus, Afghanistan.* Larvae burrow and feed in fruit; three generations between May-August in Pakistan. May infest up to 85 to 90 percent of crop in some areas; up to 65-percent infestation observed in Afghanistan areas in 1961 with as many as 50 to 100 maggots per melon. Major pest. (Fig. 36.)

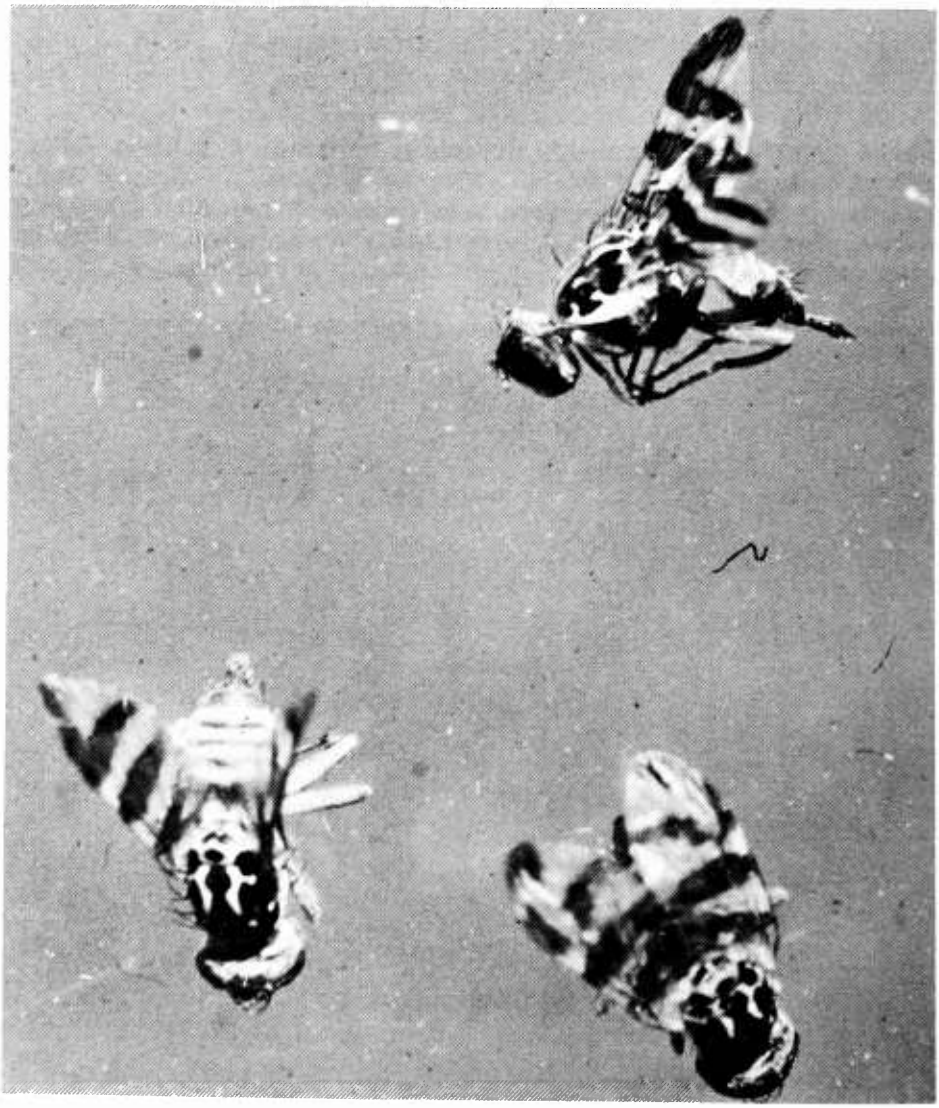

FIGURE 36.—*Myiopardalis pardalina* adults.

INSECTS AFFECTING EDIBLE LEGUMES

Principal host crops: Broadbean (*Vicia faba*), chickpea (*Cicer arietinum*), common bean (*Phaseolus vulgaris*), cowpea (*Vigna sinensis*), hyacinth-bean (*Dolichos lablab*), lentil (*Lens culinaris*), pea (*Pisum sativum*), peanut (*Arachis hypogaea*), pigeonpea (*Cajanus cajan*), soybean (*Glycine max*).

Acarina

Tetranychidae (spider mites)

Tetranychus frater Warnstein. Soybean. Libya.*

Tetrancychus tumidellus Prit. & Bak. Peanut. Turkey.

See also following species under Polyphagous Insects:

Tetranychus atlanticus McG.

Tetranychus cinnabarinus (Bdv.)

Tetranychus telarius (L.)

Orthoptera

Acrididae (Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Chrotogonus homalodemus (Blanch.)

Cyrtacanthacris tatarica (L.)

Gryllidae (crickets)

Brachytrupes megacephalus (Lef.). (See under Polyphagous Insects.)

Tettigoniidae (longhorn grasshoppers)

See following species under Polyphagous Insects:

Decticus albifrons (F.)

Tettigonia viridissima (L.)

Isoptera

Termitidae (termites)

Odontotermes (O.) sudanensis (Sjöst.). (See under Date Palm Insects.)

See also following species under Polyphagous Insects:

Microtermes obesi Holmgr.

Odontotermes obesus (Ramb.)

Thysanoptera

Thripidae (thrips)

Caliothrips impurus (Pries.). (See under Cotton Insects.)

See also following species under Polyphagous Insects:

Scirtothrips dorsalis Hood

Selenothrips rubrocinctus (Giard)

Heteroptera

Coreidae (coreid bugs)

Acanthomia brevirostris Stål. Hyacinth-bean. Sudan. Reported as feeding on this crop.

Acanthomia horrida Germ. Legumes (including peas, beans). Somalia, east Africa. Reported as injurious species.

Acanthomia tomentosicollis (Stål), bean bug. Beans. Ethiopia,* southern Africa. Feeds on pods. Heavy damage reported from Harar, Ethiopia.

Lygaeidae (lygaeid bugs)

Aphanus sordidus F. Peanut, sesame. West Pakistan. Sometimes serious.

Miridae (plant bugs)

See following species under Polyphagous Insects:

Campylomma nicolasi Put. & Reut.

Taylorilygus pallidulus (Blanch.)

Trigonotylus brevipes Jak.

Pentatomidae (stink bugs)

Agonoscelis pubescens (Thunb.). (See under Polyphagous Insects.)

Aspavia vittiventris Leth. Soybean, grasses. Ethiopia.* Light populations observed.

Bagrada cruciferarum Kirk. (See under Crucifer Insects.)

Coridius janus (F.). (See under Cucurbit Insects.)

Homoptera

Aphidae (aphids)

Aphis fabae Scop., bean aphid. Beans, beets, chard, other plants. Lebanon,* Syria, Iran,* Iraq, Libya,* Tunisia,* Israel, Cyprus, Egypt, Jordan, Turkey, Ethiopia, Afghanistan,* Greece. Considerable damage in Lebanon; heavy infestations on beets in Iran, Jordan, Libya; serious in Israel in spring.

Smynthurodes betae Westw. (See under Polyphagous Insects.)

See also following species under Insects Affecting Forage Legumes:

Acyrthosiphon pisum (Harr.). (Fig. 37.)

FIGURE 37.—*Acyrthosiphon pisum* on pea terminal.

Aphis craccivora Koch

Cicadellidae (leafhoppers)

Empoasca distinguenda Paoli. (See under Insects Affecting Special Crops.)

Tettigoniella cosmopolita (Sign.). Soybean. Ethiopia.* Very heavy infestation found in one area in 1961.

See also following species under Polyphagous Insects:

Empoasca dolichi Paoli

Empoasca lybica (Berg.)

Erythroneura lubiae China

Pseudococcidae (mealybugs)

See following species under Polyphagous Insects:

Ferrisia virgata (Ckll.)

Phenacoccus hirsutus Green

Lepidoptera

Arctiidae (tiger moths)

See following species under Polyphagous Insects:

Amsacta moorei (Butl.)

Diacrisia obliqua (Wlk.)

Geometridae (geometrid moths)

Gymnoscelis pumilata (Hbn.). Beans. Libya.* Attacks bean flowers in Libya.

Lycaenidae (blues, coppers, hairstreaks)

Catochrysops cnejus (F.). Beans, cowpea, other legumes. West Pakistan to southeast Asia. Feeds on buds and pods. Sometimes serious on cowpea in Pakistan.

Lampides boeticus (L.), bean butterfly, tailed blue, pea blue. Legumes including beans, peas, soybean, alfalfa, vetch. Cyprus, Lebanon, Arabia, Iraq, Iran, Pakistan, Afghanistan,* Ethiopia, Somalia, Libya, Egypt, Tunisia, widespread in areas of Europe, Asia, Africa. Larvae feed on flowers and seeds. Injurious to legumes in many areas, particularly in Mediterranean region, but considered minor pest in many parts of its range; almost 100-percent infestation noted in *Cytisus* seed pods in Afghanistan; major pest of sunn hemp in Pakistan.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Anticarsia irrorata (F.). Cowpea, other legumes, cereals. Sudan, Pakistan, India, Nyasaland. Minor pest in Pakistan; may be severe in India.

Autographa sp. Beans. Ethiopia.* Light infestations observed.

Tarache nitidula (F.). (See under Cotton Insects.)

Xylena exoleta (L.). Broadbean, peas, flax, alfalfa. Iraq, Libya. Feeds on foliage.

See also following species under Polyphagous Insects:

Agrotis ipsilon (Hfn.)

Autographa gamma (L.)

Chrysodeixis chalcites (Esp.)

Diachrysia orichalcea (F.)

Heliothis armigera (Hbn.)

Heliothis dipsacea (L.)

Spodoptera exigua (Hbn.)

Nymphalidae (brush-footed butterflies)

See following species under Polyphagous Insects:

Nymphalis polychloros (L.)

Vanessa cardui (L.)

Phycitidae

Etiella zinckenella (Treit.), lima-bean pod borer, legume-pod moth. Lima bean, sunn hemp, cowpea, hyacinth-bean, other legumes. Egypt, Libya, Ethiopia, Sudan, Cyprus, Israel, Iran, Lebanon, Pakistan, Saudia Arabia, Turkey, widespread over world. Larvae bore into pods. Important on lima bean and cowpea in Egypt, up to 62-percent crop loss recorded; some importance in Iran and Israel; serious on sunn hemp in Pakistan. (Fig. 38.)

Pterophoridae (plume moths)

Exelastis atomosa (Wlsm.). Beans. Pakistan, east Africa. Attacks pods, causing appreciable damage. May be serious locally.

Sphenarches caffer (Zell.). Beans, pigeonpea, hyacinth-bean, some other plants. Sudan, other African areas, Pakistan, east Asia, Australia. Minor pest of buds and flowers.

Pyraustidae (pyraustid moths)

Hedylepta indicata (F.). (See under Insects Affecting Forage Legumes.)

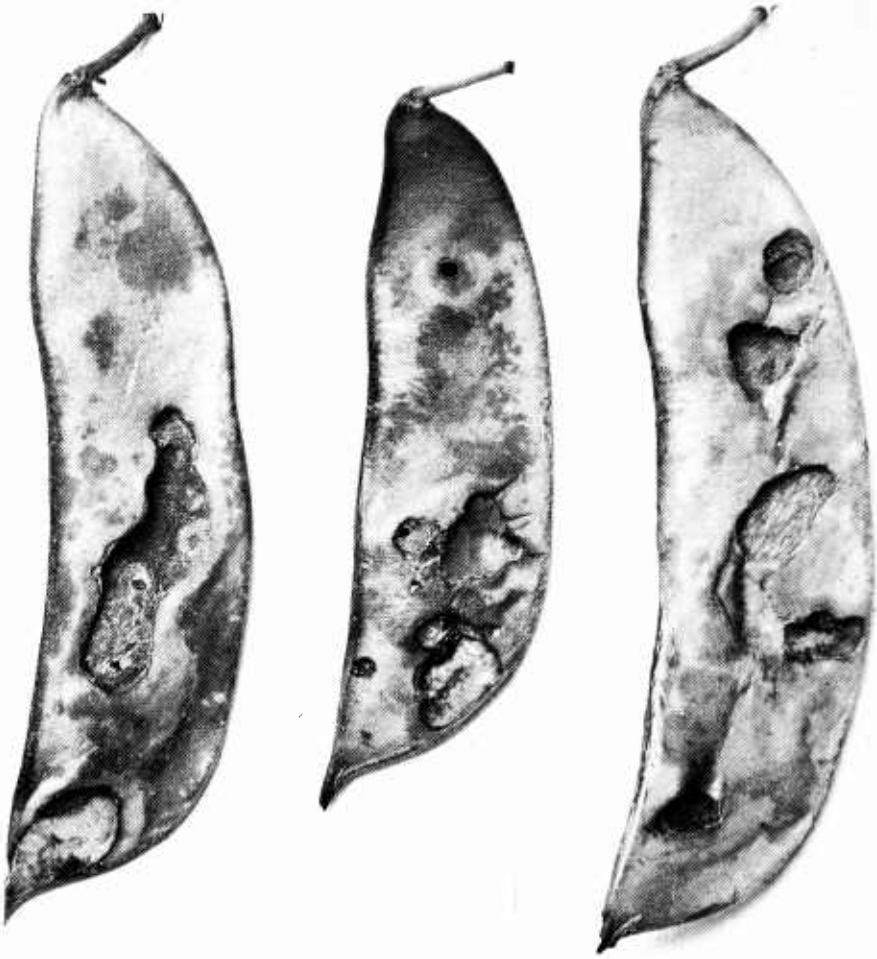

FIGURE 38.—*Etiella zinckenella* damage to lima bean pods.

Maruca testulalis (Geyer), bean pod borer. Beans, other legumes. Pakistan, Somalia, Sudan, many tropical areas of world. Destroys pods. Sometimes serious pest in Pakistan.

Sphingidae (sphinx moths)

See following species under Polyphagous Insects:

Acherontia atropos (L.)

Acherontia styx Westw.

Coleoptera

Bruchidae (seed beetles). (See under Insects Affecting Stored Products.)

Chrysomelidae (leaf beetles)

Longitarsus gossypii Bryant. (See under Cotton Insects.)

Paraluperodes quaternus (Fairm.). (Determined as *Luperodes exclamationis* Jac. from Ethiopia.†) Soybean, hyacinth-bean, beans, peas, peanut. Ethiopia, Sudan, Uganda. Light populations observed in Ethiopia. Serious pest of hyacinth-bean.

See also following species under Polyphagous Insects:

Aphthona whitfieldi Bryant

Hermaeophaga ruficollis (Lucas)

Curculionidae (weevils)

Apion aestivum Germ. (See under Polyphagous Insects.)

Apion arrogans Wenk. (See under Insects Affecting Forage Legumes.)

Apion illex (Faust). Soybean. Ethiopia,‡ other areas of Africa. Light infestation observed.

Hypera striatus (Boh.). (See under Insects Affecting Forage Legumes.)

Lixus algirus (L.). Broadbean, peas. Tunisia,‡ Israel, Jordan, Cyprus. Heavy damage in Tunisia; minor pest in Israel.

Sitona lineata (L.), pea leaf weevil. Legumes (including peas, vetch). Israel, Lebanon, Afghanistan,‡ Iran, Syria, Cyprus, Europe. Reported as serious in Lebanon; some importance in Israel.

Meloidae (blister beetles)

Ceroctis rufimembris Thomas. Beans. Somalia. Injurious.

Coryna ambigua Gerst. Chickpea, cotton. Somalia, east Africa.

Epicauta albovittata Gestro. (See under Polyphagous Insects.)

Epicauta jeanneli Pic. Beans. Somalia. Injurious pest.

Mylabris designata Reiche. (See under Insects Affecting Solanaceous Crops.)

Scarabaeidae (scarabs)

See following species under Polyphagous Insects:

Anomala egregia Gahan

Anomala plebeja Ol.

Oxythyrea pantherina (Gory & Perch.)

Tropinota squalida (Scop.)

Tenebrionidae (darkling beetles)

Gonocephalum simplex (F.). (See under Polyphagous Insects.)

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Diptera

Agromyzidae (leaf miner flies)

Liriomyza cicerina (Rond.). Chickpea. Turkey, Mines leaves.

Liriomyza congesta (Beck.) (=*trifolii* (Burg.)). Broadbean, peas. Egypt, Israel. Minor importance.

Melanagromyza obtusa (Mall.). Pigeonpea, beans, some other legumes. Pakistan, India, east Africa. Larvae feed on young seeds. May cause serious damage.

Melanagromyza phaseoli (Coq.), bean fly. Pest of beans principally, other legumes. Jordan, Israel, Pakistan, Egypt, Sudan, many other African countries. Mines in leaves and stems. Frequently causes loss of bean crop in some areas; serious on cowpea in Pakistan; most destructive pest of snap bean in Egypt.

Tephritidae (=Trypetidae) (fruit flies)

See following species under Cucurbit Insects:

Dacus ciliatus Loew

Dacus cucurbitae Coq.

INSECTS AFFECTING SOLANACEOUS CROPS

Principal host crops: Eggplant (*Solanum melongena*), pepper (*Capsicum* spp.), potato (*Solanum tuberosum*), tobacco (*Nicotiana tabacum*, possibly other species), tomato (*Lycopersicon esculentum*).

Acarina

Eriophyidae (eriophyid mites)

Aculus lycopersici (Massee), tomato russet mite. Tomato. Saudi Arabia, Israel, Iran. Eriophyid mites (may be this species) also reported on tomato from Libya, Tunisia, Lebanon, Syria, Cyprus; severe russeting and bronzing reported from Iran and Saudi Arabia.

Phytoptus cladophthirus Nal., tomato gall mite. Tomato. Egypt, southern Africa. Serious pest of seedlings in Egypt; damaging in southern Africa; attacked plants appear silvery.

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Acrotylus insubricus (Scop.)

Anacridium aegyptium (L.)
Calliptamus barbarus Costa
Calliptamus palaestinensis Ramme
Chrotogonus trachypterus robertsi Kirby
Chrotogonus trachypterus trachypterus (Blanch.)
Oedipoda caerulescens (L.)
Thisoicetrinus pterostichus (F. W.)

Gryllidae (crickets)

Gryllus bimaculatus DeG. (See under Polyphagous Insects.)

Gryllotalpidae (mole crickets)

Gryllotalpa africana P. de B. (See under Polyphagous Insects.)

Isoptera

Termitidae (termites)

See following species under Polyphagous Insects:
Microtermes obesi Holmgr.
Odontotermes obesus (Ramb.)

Thysanoptera

Thripidae (thrips)

See following species under Polyphagous Insects:
Frankliniella intonsa (Tryb.)
Scirtothrips dorsalis Hood
Thrips tabaci Lind.

Heteroptera

Miridae (plant bugs)

Calocoris norvegicus (Gmel.). (See under Insects Affecting Forage Legumes.)

Cyrtopeltis (Nesidiocoris) tenuis Reut., tomato bug. Tomato, egg plant, tobacco, potato. Libya,* Egypt, Jordan, Israel, Sudan, Tunisia. Prefers blossoms as feeding site. Common but seldom injurious in Libya; slight to moderate damage in Israel; sometimes numerous in Egypt; minor pest of tomato in Sudan.

Lygus pratensis (L.). (See under Polyphagous Insects.)

Pentatomidae (stink bugs)

Coridius janus (F.). (See under Cucurbit Insects.)

Holcogaster fibulata var. ***exilis*** Horv. Tobacco. Libya.*

See also following species under Polyphagous Insects:

Carpocoris purpureipennis (DeG.)

Dolycoris baccarum (L.)

Dolycoris penicillatus (Horv.)

Rhopalidae (=Coreidae)

Liorhyssus hyalinus (F.). (See under Polyphagous Insects.)

Tingidae (lace bugs)

Urentius hystricellus (Rich.) (=*aegyptiacus* Berg., *sentis* Dist., *echinus* Dist.). Eggplant. Sudan,* Egypt, Pakistan, India, Ceylon. Adults and nymphs feed on leaves of eggplant; sometimes numerous and damaging. Important pest in Pakistan; common in Sudan; requires controls in some areas.

Homoptera

Aphidae (aphids)

Myzus persicae (Sulz.). (See under Polyphagous Insects.) (Fig. 39.)

Cicadellidae (leafhoppers)

Circulifer tenellus (Baker). (See under Insects Affecting Beets and Related Crops.)

Empoasca signata Haupt. Eggplant, tomato, pepper. Israel. Considerable damage.

See also following species under Polyphagous Insects:

Empoasca devastans Dist.

Empoasca flavescens (F.)

Empoasca lybica (Berg.)

Membracidae (treehoppers)

Oxyrachis tarandus (F.). Tomato. Libya,* Egypt, Afghanistan.

Ortheziidae (ensign scales)

Orthezia insignis Browne. (See under Polyphagous Insects.)

Pseudococcidae (mealybugs)

Ferrisia virgata (Ckll.). (See under Polyphagous Insects.)

FIGURE 39.—*Myzus persicae* colony.

Lepidoptera

Gelechiidae (gelechiid moths)

Gelechia plebeiella Zell. Tomato. Libya, Israel, southern Europe. Serious pest on tomato at times in Libya.

Gnorimoschema ergasima (Meyr.). Eggplant. Iraq, Egypt, India. Minor pest.

Gnorimoschema heliopa (Lower), tobacco stem borer. Tobacco, eggplant, wild Solanaceae. Turkey, Cyprus, Sudan, Israel, Somalia, Greece, West Pakistan, India to Australia, southeastern Africa. Mines in leaves and stems, causing galls. Major pest of tobacco in Australia, Ceylon, Malaya; damaging in Turkey; bores into flowers and buds of eggplant in Sudan.

Gnorimoschema operculella (Zell.), potato tuberworm. Stored and field potatoes, tobacco (field), other Solanaceae. Cyprus, Libya,* Tunisia, Lebanon, Syria, Iraq, Jordan, Israel, Pakistan, Egypt, Ethiopia, widespread in many parts of world. Widespread important pest, especially on stored potato; serious in Lebanon and Syria; important in Libya on potato and tobacco; severe infestations observed on potato in Ethiopia. (Fig. 40.)

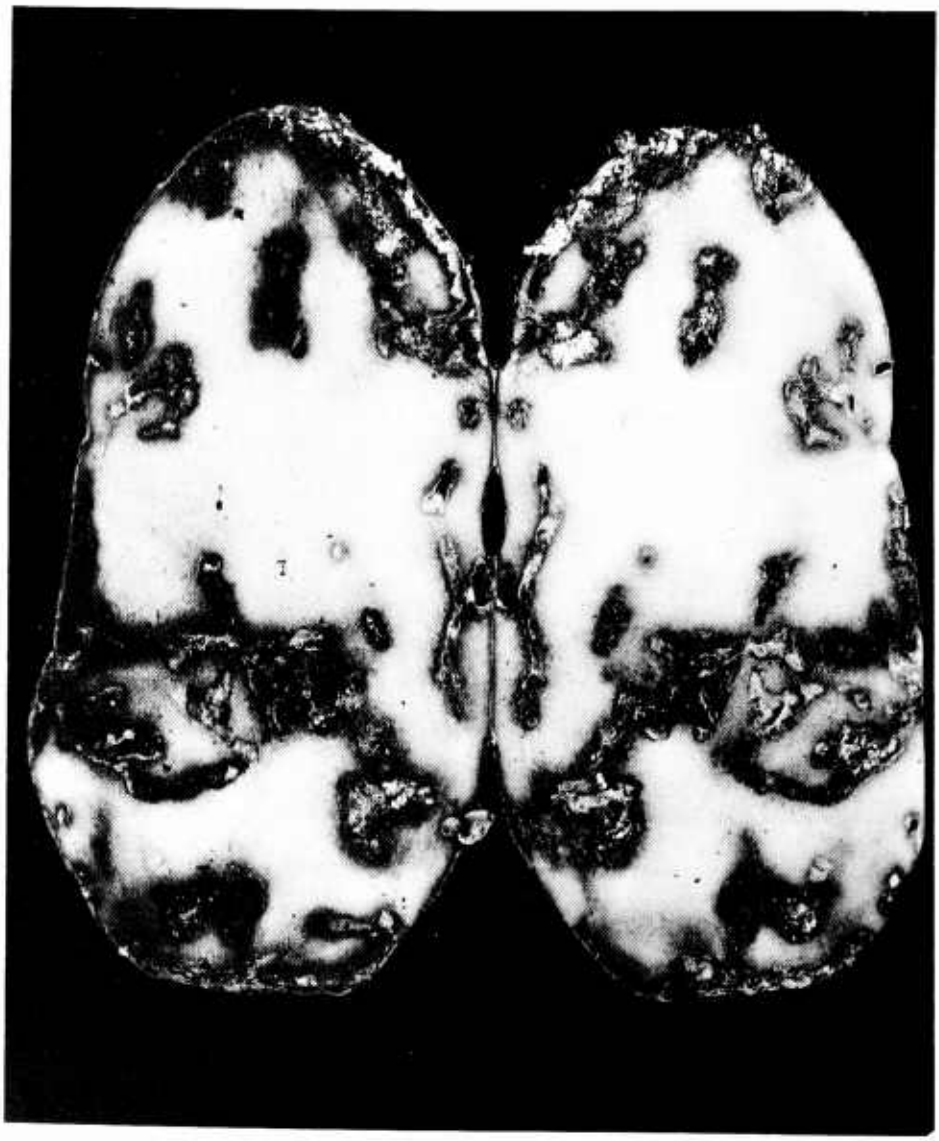

FIGURE 40.—*Gnorimoschema operculella* damage to potato tuber.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Agrotis comes (Treit.). Tobacco. Turkey. Some damage.

Eublemma olivacea (Wlk.), brinjal leaf roller. Eggplant, wild Solanaceae. Pakistan, India, Burma, Ceylon. Bores into stems. Occasionally destructive.

Euxoa tritici (L.). Tobacco, cotton. Turkey, U.S.S.R. Causes some damage to tobacco in Turkey.

Euxoa trux (Hbn.). Potato, other low plants. Libya, Tunisia. Minor pest in Libya; one of most damaging cutworms in Tunisia.

See also following species under Polyphagous Insects:

Agrotis flammatra (Denis & Schiff.)

Agrotis ipsilon (Hufn.)

Agrotis pronuba (L.)

Chrysodeixis chalcites (Esp.)

Eublemma brachygonia Hmpsn.

Euxoa conspicua (Hbn.)

Euxoa segetum (Denis & Schiff.)

Euxoa spinifera (Hbn.)

Feltia exclamationis L.

Heliothis armigera (Hbn.)

Heliothis dipsacea (L.)

Heliothis nubigera (H.-S.)

Heliothis peltigera (Denis & Schiff.)

Prodenia litura (F.)

Spodoptera exigua (Hbn.)

Trichoplusia ni (Hbn.)

Nymphalidae (brush-footed butterflies)

Acraea terpsichore (L.). (See under Polyphagous Insects.)

Phycitidae

Euzophera osseatella (Tr.), eggplant stem borer. Eggplant, potato, tomato, pepper, tobacco. Tunisia, Algeria, Morocco, Egypt, Cyprus, Israel, Syria, southern Europe. Six generations a year in Israel. Bores into stems, can cause important injury. Serious damage to potato reported from Israel.

Euzophera perticella Rag., brinjal stem borer. Eggplant, pepper, tomato, potato. West Pakistan, India. Serious pest of eggplant in times, especially in West Pakistan.

Pyraustidae (pyraustid moths)

Leucinodes orbonalis Gn., eggplant fruit borer. Eggplant, potato, tomato, other Solanaceae. Pakistan* eastward through Asia; Somalia, Ethiopia,* other areas of Africa. Injurious to eggplant in Indian region; important in Pakistan; damages potato in Congo.

Ostrinia nubilalis (Hbn.). (See under Polyphagous Insects.)

Sceliodes laisalis Wlk. Eggplant, pepper, tomato. Sudan, Somalia, Uganda, Arabia. Damages tomato fruit in Sudan.

Sphingidae (sphinx moths)

See following species under Polyphagous Insects:

Acherontia atropos (L.)

Acherontia styx Westw.

Coleoptera

Chrysomelidae (leaf beetles)

Aphthona latipennis Pic. (See under Polyphagous Insects.)

Epitrix torvi Bryant. Eggplant. Sudan. Feeds on leaves.

Labidostomis decipiens (Fald.). (See under Grape Insects.)

Coccinellidae (lady beetles)

Epilachna fulvosignata Reiche. Eggplant. Ethiopia.* Heavy damage observed in Ethiopia.

Epilachna hirta (Thunb.). Vegetables, grasses. Ethiopia southward in Africa. Recorded as pest, sometimes serious.

Epilachna sparsa (Hbst.). (See under Cucurbit Insects.)

Epilachna vigintioctopunctata (F.). Eggplant, other Solanaceae, also reported on cucurbits, other plants. West Pakistan to Australia. Recorded as pest in West Pakistan and India. (Records may involve other *Epilachna* species.)

Epilachna wissmanni Muls. *Solanum* sp. West Pakistan.* Observed causing heavy damage to wild *Solanum.*

Elateridae (wireworms)

Conoderus (Heteroderes) bicarinatus (Reit.). Tobacco, cotton. Jordan, U.S.S.R. (Transcaucasia, Turkestan). Attacks roots.

Melanotus fusciceps (Gyll.). Tobacco, other plants. Israel, Cyprus, U.S.S.R. (Transcaucasia).

See also following species under Polyphagous Insects:

Agriotes meticulosus Cand.

Agriotes pilosus (Panz.)

Lagriidae

Lagria villosa F. Potato, cotton. Ethiopia, east Africa.

Meloidae (blister beetles)

Epicauta erythrocephala Pall. (See under Polyphagous Insects.)

Mylabris designata Reiche. Potato, fava bean. Ethiopia.

Mylabris flavoguttata Reiche. Potato, other Solanaceae, cucurbits. Ethiopia.

Scarabaeidae (scarabs)

Pleurophorus caesus (Cr.). Tobacco. Libya,* Egypt. Importance on this crop not known.

Polyphylla fullo (L.). (See under Polyphagous Insects.)

Tenebrionidae (darkling beetles)

Apentanodes globosus (Reiche). Tobacco. Cyprus. Damages young plants.

Zophosis punctata Brullé. Tobacco. Cyprus. Damages young plants.

See also following species under Polyphagous Insects:

Gonocephalum simplex (F.)

Opatriodes punctulatus Brullé

Diptera

Bibionidae (march flies)

Bibio hortulanus (L.). (See under Polyphagous Insects.)

Cecidomyiidae (=Itonididae) (gall midges)

Asphondylia capsici Barnes. Peppers. Turkey, Cyprus. Deforms flowers, buds, fruit.

Lonchaeidae

Silba pendula (Bezzi). Red pepper. Libya. Secondary injury following *Ceratitis capitata* attack.

Tephritidae (=Trypetidae) (fruit flies)

See following species under Citrus Insects:

Ceratitis capitata (Wied.)

Dacus dorsalis Hend.

See following species under Cucurbit Insects:

Dacus bivittatus cucumarius Sack.

Dacus ciliatus Loew

Dacus cucurbitae Coq.

INSECTS AFFECTING MISCELLANEOUS VEGETABLES

Principal host crops: Artichoke (*Cynara scolymus*), carrot (*Daucus carota*), celery (*Apium graveolens*), lettuce (*Lactuca sativa*), onion, garlic (*Allium* spp.), sweetpotato (*Ipomoea batatas*).

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:

Calliptamus italicus (L.)

Chrotogonus trachypterus trachypterus (Blanch.)

Phymateus viridipes Stål

Schistocerca gregaria (Forsk.)

Gryllidae (crickets)

See following species under Polyphagous Insects:

Brachytrupes megacephalus (Lef.)

Melanogryllus desertus (Pall.)

Gryllotalpidae (mole crickets)

See following species under Polyphagous Insects:

Gryllotalpa gryllotalpa (L.)

Gryllotalpa unispina Sauss.

Tettigoniidae (longhorn grasshoppers)

Eugasteroides loricatus (Gerst.). Vegetables (including tomato, eggplant). Ethiopia. Considerable damage in gardens.

Thysanoptera

Thripidae (thrips)

See following species under Polyphagous Insects:
Retithrips syriacus (Mayet)
Thrips tabaci Lind.

Heteroptera

Coreidae (coreid bugs)

Leptoglossus membranaceus (F.). (See under Polyphagous Insects.)

Lygaeidae (lygaeid bugs)

See following species under Polyphagous Insects:
Nysius cymoides (Spin.)
Spilostethus pandurus (Scop.)

Pentatomidae (stink bugs)

Graphosoma italica Mueller. Umbelliferae. Iran.* Heavy populations reported from one area.
Graphosoma semipunctata (F.). Carrot, dill. Libya.* Heavy populations observed on flowers.
Tholagmus flavolineatus (F.). Carrot, dill. Libya.* Heavy populations observed on flowers.
See also following species under Polyphagous Insects:
Calidea duodecimpunctata (F.)
Dolycoris baccarum (L.)
Nezara viridula (L.)
Stenozygum coloratum (Klug)

Homoptera

Aleyrodidae (whiteflies)

See following species under Polyphagous Insects:
Bemisia tabaci (Genn.)
Trialeurodes vaporariorum (Westw.)

Aphidae (aphids)

Acyrthosiphon (Tlja) scariolae (Nevsky). Lettuce. Iran. Severe on young leaves and terminal parts of plant.

Aphis intybi Koch. *Cichorium* sp. Libya, Israel, Europe. Minor pest in Libya.

Brachycaudus cardui (L.). Artichoke, plum. Ethiopia, Libya, Lebanon, Israel, Turkey, Afghanistan.* Very serious on artichoke in Lebanon.

Capitophorus elaeagni (Del Guer.). Artichoke, cucurbits, *Elaeagnus* spp. Libya,* Ethiopia, Egypt, Israel, Turkey, probably cosmopolitan. Attacks leaves. Heavy infestations in Libya.

Cavariella aegopodii (Scop.). Celery, fennel, willow. Libya,* Egypt, Ethiopia,* Israel, Turkey, Europe, central Asia. Minor pest locally in Libya; heavy damage on fennel in Ethiopia.

Dactynotus cichorii (Koch). Chicory. Libya.*

Dactynotus compositae (Theob.). Artichoke, chrysanthemum, dahlia, Solanaceae, other plants. Egypt, Israel, Jordan, Ethiopia, Somalia, east Africa.

Dysaphis apiifolia (Theob.). Celery, artichoke. Egypt, Europe. Some damage to seed production.

Dysaphis foeniculus (Theob.). Celery, dill. Ethiopia,* Libya.* Heavy infestations reported from Ethiopia.

Hyadaphis apii Hall. Celery. Egypt, Israel, Morocco. Some damage to seed production.

Hyadaphis coriandri (Das). Carrot, celery, other Umbelliferae. Egypt, Iraq, Israel, Libya,* Pakistan.

Hyadaphis foeniculi (Pass.). Celery, *Lonicera* spp. Libya, Israel, Turkey, Europe, Morocco. Minor pest locally in Libya on celery; heavy damage on *Lonicera* in Israel.

Macrosiphum euphorbiae (Thos.). Sweetpotato. Ethiopia.* Light infestations observed.

Nasonovia (Hyperomyzus) lactucae L. Lettuce. Libya.

Cicadellidae (leafhoppers)

Empoasca facialis (Jac.). (See under Polyphagous Insects.)

Ortheziidae (ensign scales)

Orthezia insignis Browne. (See under Polyphagous Insects.)

Lepidoptera

Cossidae (carpenterworm moths)

Dyspessa ulula (Borkh.). Onion, garlic. Iraq, Turkey, Syria, Israel, north Africa, southern Europe. Larva bores into bulb, may move from plant to plant, causing heavy loss in some instances.

Gelechiidae (gelechiid moths)

Brachmia convolvuli (Wlsm.). Sweetpotato. Somalia, other areas of Africa, India.

Lyonetiidae

Bedellia somnulentella (Zell.), morning-glory leaf miner. Sweetpotato. Egypt, Ethiopia.* Minor pest in Egypt; heavy populations observed in sweetpotato at Jimma, Ethiopia, where around 20 percent of leaves mined.

Noctuidae (=Phalaenidae) (owlet moths, cutworms)

Hydroecia xanthenes (Germ.). Artichoke. Tunisia,* France, Italy. Feeds in buds and petioles, heavy damage in Tunisia, Italy, France; up to 55-percent loss in Sardinia.

Triphaena fimbria (L.). Lettuce. Libya. Injurious.

See also following species under Polyphagous Insects:

Agrotis ipsilon (Hufn.)

Agrotis pronuba (L.)

Autographa gamma (L.)

Chrysodeixis chalcites (Esp.)

Cornutiplusia circumflexa (L.)

Diachrysia orichalcea (F.)

Feltia exclamationis (L.)

Mamestra brassicae (L.)

Prodenia litura (F.)

Trichoplusia ni (Hbn.)

Nymphalidae (brush-footed butterflies)

See following species under Polyphagous Insects:

Acraea terpsichore (L.)

Vanessa cardui (L.)

Oecophoridae

Agonopterix sp. Artichoke. Tunisia (determined as near or equal to this genus).* Larvae observed causing serious injury to petioles and buds, population very heavy.

Lepidechidna acharnias Meyr. Artichoke. Tunisia. Heavy populations reported in stems and heads.

Papilionidae (swallowtail butterflies)

Papilio machaon L. (See under Citrus Insects.)

Sphingidae (sphinx moths)

Acherontia styx Westw. (See under Polyphagous Insects.)

Herse convolvuli (L.). Sweetpotato, beans. Egypt, Tunisia, Libya, Somalia, Sudan, Pakistan, Arabia, Israel, Iraq, Syria. Migrates from Tropics. Can cause complete defoliation in high populations; apparently heavy concentrations not common.

Coleoptera

Cerambycidae (roundheaded wood borers)

Agapanthia cardui (L.). Artichoke, safflower. Israel, other eastern Mediterranean areas. Larvae bore into stems.

Phytoecia cylindrica (L.), carrot borer. Carrot. Israel, Turkey, parts of Europe and U.S.S.R. Larvae bore in stalk, may cause death of young plants.

Chrysomelidae (leaf beetles)

Cassida deflorata Suffr. Artichoke. Libya, Greece. Important in some areas of Libya.

Cassida palaestina Reiche. Artichoke. Lebanon. Reported as serious pest.

Conchyloctenia (Aspidomorpha) parummaculata (Boh.). Sweetpotato. Somalia, east Africa.

Crioceris sp. Ethiopia.* Heavy on wild asparagus.

Crioceris asparagi (L.), asparagus beetle. Asparagus. Libya, Israel, Europe. Appeared in Israel when asparagus began to be cultivated.

Crioceris bicruciata Sahlb. Asparagus. Cyprus.

Crioceris nigropunctata f. ***defecta*** Wse. Asparagus. Somalia. Injurious.

Crioceris nigropunctata Lac. ssp. ***parvula*** Heinze. Asparagus. Somalia.

Exora collaris (Humm.). Onion. Turkey. Damage to leaves.

Sphaeroderma testaceum (F.). Artichoke, wild composites. Israel, north Africa, Europe. Adults and larvae feed on leaves; larvae cause injury by mining in leaves. Heavy infestation rare in Israel.

See also following species under Polyphagous Insects:

Altica pyritosa Erich.

Aphthona fuentei Reit.

Curculionidae (weevils)

Alcidodes erroneus Thomps. Sweetpotato, eucalyptus. Somalia.

Alcidodes humerosus Harold. Sweetpotato. Ethiopia.‡ Heavy infestation noted on stems at ground level.

Blosyrus rugulosus Auriv. ssp. ***abyssinicus*** Auriv. Sweetpotato. Ethiopia.† Heavy infestations observed on stems.

Cylas formicarius formicarius (F.). Sweetpotato. Sudan,* east Asia. Medium infestations in Sudan.

Cylas punticollis Boh., sweetpotato weevil, sweetpotato root borer. Sweetpotato. Somalia, Nigeria, Sudan, Kenya. One of most important pests of sweetpotato in Kenya; principal pest of this crop in Sudan.

Hypera fausti Petri. Strawberry. Jordan, Israel. Reported as damaging on leaves.

Lixus lutescens Cap. Artichoke. Cyprus.

Elateridae (wireworms)

See following species under Polyphagous Insects:

Agriotes lineatus (L.)

Agriotes pilosus (Panz.)

Cardiphorus rufipes (Goeze)

Meloidae (blister beetles)

Mylabris (Zonabris) convexior Pic. Vegetable crops. Somalia. Causes complete defoliation.

Scarabaeidae (scarabs)

See following species under Polyphagous Insects:

Polyphylla fullo (L.)

Rhizotrogus aequinoctialis (Hbst.)

Hymenoptera

Tenthredinidae (sawflies)

Athalia vollenhoveni Grib. Artichoke. Ethiopia.* Light infestations reported.

Diptera

Agromyzidae (leaf miner flies)

Tylomyza pinguis (Fall.). Lettuce. Egypt, Europe.

Anthomyiidae

Hylemya antiqua (Meig.), onion maggot. Onion, garlic. Cyprus, Iran (specimens from Iran determined near or equal to this species), Israel, Greece, many other areas. Of some importance in Iran and Israel.

Tephritidae (=Trypetidae) (fruit flies)

Capparimyia savastani (Mart.), caper fly. Caper (*Capparis spinosa*). Tunisia.* Attacks fruit.

Euleia heraclei (L.), celery fly. Celery, parsnip, chief cultivated hosts. Cyprus, Turkey, Morocco, generally in Europe. Frequently causes great reduction in value of celery and parsnip crops in Europe.

INSECTS AFFECTING STORED PRODUCTS

Acarina

Acaridae (acarid mites)

Acarus siro L. (=*Tyroglyphus farinae* L.), flour mite, grain mite. Grains, flour, cereal products. Tunisia, Egypt, Turkey, Iran. Injurious in some areas; reported important in Iran.

Aleuroglyphus ovatus Troup. Stored products. Iran.

Tyrophagus tenuiclavus Zach. Grains. Tunisia.

Urodinychidae

Leiodinychus krameri Can. Stored grains. Turkey, Tunisia, Morocco.

Orthoptera

Blattidae (cockroaches)

Blatta orientalis (L.), oriental cockroach. Stored products. Jordan, Libya, Iraq, Iran, Egypt, widespread. Important in Iran.

Blattella germanica (L.), German cockroach. Stored products. Libya, Iran, Cyprus, Egypt, widespread. Important in Iran.

Periplaneta americana (L.), American cockroach. Stored products. Iran, Iraq, Pakistan, Turkey, Egypt, Libya, Cyprus, widespread.

Periplaneta australasiae (F.), Australian cockroach. Bread, other stored products. Iran. Rated as important pest.

Polyphaga aegyptiaca (L.). Stored products. Iraq, Iran, Egypt. Not common in houses. Reported to be of some economic importance in Iran.

Polyphaga (Heterogamia) saussurei (Dohrn.). Stored products. Iran. Reported to be of some importance.

Shelfordella tartara (Sauss.). Stored products. Iran. Reported to be of some importance.

Supella supellectilium (Serv.), brown-banded roach, furniture cockroach. Israel, Egypt. Common in Egypt.

Gryllidae (crickets)

See following species under Polyphagous Insects:

Acheta domesticus (L.)

Gryllus campestris L.

Isoptera

Hodotermitidae (termites)

Anacanthotermes turkestanicus (Jacobson), harvester termite. Occasionally damages contents of buildings. Afghanistan,* U.S.S.R. (Turkestan).

Anacanthotermes vagans septentrionalis (Jacobson). Railroad ties, dried wood, stems and roots of living plants. Iran,* Afghanistan. Economic importance in Iran.

Rhinotermitidae (termites)

Coptotermes sjostedti Holmg. Stored food. Sudan.*

Termitidae (termites)

Macrotermes natalensis (Haviland). Trees, wood. Sudan.*

Pseudacanthotermes militaris (Hagen). Wood, tobacco stems. Sudan.*

Lepidoptera

Galleriidae (wax moths)

Achroia grisella (F.), lesser wax moth. Beeswax. Egypt, Libya, India.

Aphomia gularis (Zell.), stored nut moth. Hazelnut, walnut, peanut, other nuts. Turkey, southeastern Asia, western Europe. Attacks stored nuts.

Corcyra cephalonica (Staint.), rice moth, cereal moth. Stored products including date. Turkey, Egypt, Libya,* Sudan, Pakistan, Se-

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malia, Cyprus. Important pest in Somalia; problem in Pakistan flour mills.

Galleria mellonella (L.), greater wax moth. Beeswax. West Pakistan, Iran, Turkey, Arabia, Cyprus, Egypt, Libya. Severe pest in Iran; destructive in Egypt.

Gelechiidae (gelechiid moths)

Gnorimoschema operculella (Zell.). (See under Insects Affecting Solanaceous Crops.)

Sitotroga cerealella (Ol.), Angoumois grain moth. Stored grains, other products. Turkey, Cyprus, Tunisia, Egypt, Ethiopia,* Libya, Lebanon, Israel, Syria, Pakistan, Sudan, Algeria, Greece. One of most serious grain pests in Libya, Turkey, Sudan, Pakistan; injurious in Egypt. Second only to rice and granary weevils as stored-grain pest. (Fig. 41.)

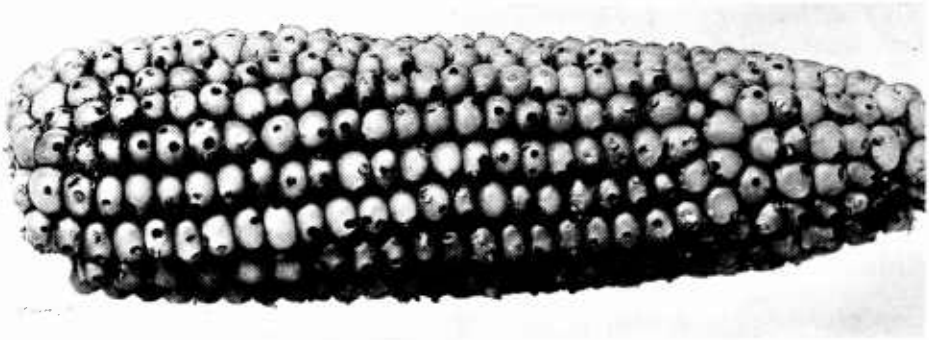

FIGURE 41.—*Sitotroga cerealella* infestation in corn.

Heliodinidae

Stathmopoda trissorrhiza Meyr. Stored products. Pakistan. Important pest causing serious damage to raisins and date.

Phycitidae

Anagasta (Ephestia) kuhniella (Zell.), Mediterranean flour moth. Flour, stored products. Iran, Pakistan, Turkey, Tunisia, Egypt, Libya, Lebanon, Ethiopia,* Greece, cosmopolitan. Severe pest in Iran and Pakistan; important in other areas.

Cadra calidella (Gn.), carob moth. Dried fruit. Iraq, Iran, Libya, Egypt, Lebanon.* Important pest on dried fruit; principal pest of ripe and dried dates in Egypt.

Ectomyelois ceratoniae (Zell.). (See under Polyphagous Insects.)

Ephestia cautella (Wlk.), tropical warehouse moth, almond moth, fig moth. Fig, raisins, flour, date, rice, grain sorghum. Cyprus, Turkey, Libya, Egypt, Sudan,* Somalia, Iran, Iraq, Pakistan, Ethiopia,* Lebanon, Greece, Morocco, widespread. Principal pest of fig and raisins in Turkey, date in Egypt; important stored-products pest in Iran, other areas. This species and other *Ephestia* spp. cause 20-percent damage in Turkey.

Ephestia elutella (Hbn.), tobacco moth, raisin moth, warehouse moth. Stored tobacco, seed, other stored products. Cyprus, Turkey, Iran, Iraq, Egypt, Jordan, Libya, Greece, widespread. Important pest in Iran.

Ephestia figulilella Greg., raisin moth. Fig, raisins, date. Egypt, Cyprus, Turkey, Greece. Principal pest of fig and raisins in Turkey.

Plodia interpunctella (Hbn.), Indian-meal moth. Corn, dried fruit, stored products. Turkey, Cyprus, Afghanistan, Pakistan, Iran, Egypt, Lebanon, Tunisia, Saudi Arabia, Libya,* Ethiopia,* Somalia, Greece, Algeria, Morocco. Important in dried fig in Turkey; severe in stored fruit and nuts in Iran; rare in Pakistan.

Pyralidae (pyralid moths)

Aglossa pinguinalis (L.), grease moth. Refuse of cereals, seed, other stored products. Iraq, Afghanistan,* Libya, Egypt, Europe. Importance unknown.

Arenipses sabella (Hmpsn.). (See under Date Palm Insects.)

Hypsopygia costalis (F.), clover hayworm. Stored clover, other fodder. Iraq, Libya.

Pyralis farinalis L., meal moth, meal snout moth. Stored products. Cyprus, Turkey, Iran, Pakistan, Tunisia, Libya,* Egypt, Lebanon, Iraq. Minor pest in Pakistan.

Tineidae (clothes moth)

Haplotinea ditella (Pierce & Diakonoff). Stored products. Turkey, Iran.

Nemapogon granella (L.), corn moth, European grain moth. Stored grain. Lebanon, Libya, Turkey, Europe, most parts of world. Regarded as important pest in Lebanon.

Niditinea fuscipunctella (Haw.), common clothes moth. Stored products including dried fruit. Iran, Pakistan, India, Iraq, Egypt.

Tinea pellionella (L.), casemaking clothes moth. Stored products. Turkey, Libya, Egypt, Iran, Greece. Serious pest in Iran.

Tineola biselliella (Hum.), common clothes moth, webbing clothes moth. Stored products. Iran, U.S.S.R., Greece. Severe pest in Iran.

Trichophaga tapetzella (L.), carpet moth. Wool and hair products. Iran, U.S.S.R. Larvae cause severe damage.

Coleoptera

Anobiidae (deathwatch beetles)

Anobium punctatum (DeG.) (=*A. domesticum* Geoffr.), European furniture beetle. Hardwood and coniferous timbers used in construction and furniture. Iran. Larvae tunnel through dry wood, causing medium damage.

Lasioderma serricorne (F.), cigarette beetle. Stored tobacco, seed, other products. Turkey, Somalia, Pakistan, Libya,* Egypt, Iran, Cyprus, Greece, widely distributed over world. Primarily pest of stored tobacco. Important in Pakistan and Iran.

Stegobium paniceum (L.), biscuit beetle, drugstore beetle. Stored products, drugs, grain products. Ethiopia,* Iran, Turkey, Libya, Egypt, Europe. Not much importance in grains generally; economic pest in Iran.

Anthicidae (antlike flower beetles)

Anthicus floralis (L.). Stored products. Iran, Egypt, Morocco.

Anthribidae (fungus weevils)

Araecerus fasciculatus (DeG.), coffee bean weevil. Cottonseed, dried fruit, coffee bean, spices. Iran, Pakistan, Europe, probably cosmopolitan.

Bostrichidae (false powder-post beetles)

Dinoderus minutus (F.), bamboo borer. Bamboo. Egypt, Asia, cosmopolitan. Larvae attack dead bamboo; often found in shipments.

Rhyzopertha dominica (F.), lesser grain borer. Stored wheat, other cereals. Egypt, Turkey, Iran, Iraq, Israel, Cyprus, Tunisia, Libya,* Sudan, Afghanistan, Pakistan, Ethiopia, Somalia, Greece, Italy, Morocco, Algeria. Severe damage in Libya and Sudan; principal pest in Iran, Pakistan, Turkey.

Xylopertha picea (Ol.). Seasoned lumber. Sudan. Pest of native timber.

Bruchidae (seed beetles)

Acanthoscelides obtectus (Say), bean weevil, dried bean beetle. Bean, other legume seed. Egypt, Libya,* Turkey, Iran, India, Greece, U.S.S.R. (Caucasus), widespread over world. Attacks seed in field and storage. Important in some areas, particularly Israel.

Bruchidius incarnatus (Boh.). Broadbean, peas, chickpea. Tunisia, Algeria, Egypt. Damaging, particularly in Egypt.

Bruchidius meleagrinus Gene. Lebanon.* Collected in grain-legume mixture in field.

Bruchidius quinqueguttatus (Ol.). Lentil, broadbean, vetch, other legume seed. Iraq, Cyprus, Egypt, Turkey, Israel, Algeria, southern Europe. Attacks both green and dry seed.

Bruchidius (Bruchus) trifolii (Motsch.). Alfalfa, berseem seed. Egypt, Israel. Important damage to berseem seed, destroys viability.

Bruchidius (Bruchus) unicolor (Ol.) (=*canus* Germ.). Legume seed. Iran, Cyprus, Algeria, Europe. Infestation begins in field, continues in storage.

Bruchus affinis Froel. Sweetpea, vetch, hyacinth-bean. Syria, north Africa, Europe into central Asia. Pest of some importance.

Bruchus baudoni (Cail.). Seeds of *Acacia arabica*, *Dolichos lablab*, *Abutilon* sp. Sudan.

Bruchus brachialis (Fahr.), vetch bruchid. Vetch seed. Libya, other Mediterranean areas.

Bruchus dentipes Baudi. Broadbean, vetch, other stored legumes. Cyprus, Iran, Egypt, Arabia, Iraq, Israel, Turkey, southern U.S.S.R. One generation per year in Israel. Very injurious to broadbean.

Bruchus emarginatus All. Stored peas, cowpea, vetch, other legumes. Tunisia, Iran, Israel, Lebanon, Syria, Turkey, India, Algeria, Japan, U.S.S.R. (Caucasus), southern Europe. Important pest.

Bruchus ervi Froel. (=*sertatus* Ill.). Vetch, lentil, beans, other stored legumes. Lebanon, Israel, Iran, Libya, Europe. Serious in Lebanon; some importance in Israel.

Bruchus lentis Froel., lentil weevil. Lentil. Iran,* Cyprus, Egypt, Libya,* Israel, Syria, Algeria, Morocco, Europe into central Asia. Larvae feed in seed in field and storage. Up to 80-percent infestation in Iran; seriously reduces yields in field in Algeria.

Bruchus pisorum L., pea weevil. Peas, alfalfa, stored products. Tunisia, Brazil, Uruguay, Israel, Lebanon,* Libya,* Egypt, Ethiopia, Pakistan, Turkey, Iran, cosmopolitan. Larvae feed in seed in field and storage. Serious in Lebanon and Iran; important in Israel.

Bruchus rufimanus Boh. (=*fabae* Motsch.), broadbean weevil, large bean seed beetle. Beans, peas, vetch, sometimes lentil. Tunisia, Iraq,* Israel, Lebanon, Turkey, Iran, Afghanistan,* Libya, Egypt, Europe. Larvae feed in seed in field and storage; one generation a year. Serious in Lebanon and Iran; some importance in Israel.

Bruchus signaticornis Gyll. (=*pallidicornis* Boh.). Lentil. Libya, Egypt, other north African areas, Turkey, Syria, Europe. Infestations start in field, continue in storage. Serious damage.

Bruchus tristis Boh. Vetch, peas, beans. Egypt, Iran, Syria, Turkey, Israel, Jordan, Europe. Important pest in seed in some countries.

Callosobruchus (Bruchus) analis (F.). Stored beans, other legumes. Pakistan, Cyprus, Arabia, Iran, Uganda, southern Europe. Important pest in Pakistan and India.

Callosobruchus (Bruchus) chinensis (L.), cowpea beetle. Stored legumes including beans and lentil. Ethiopia,* Iran, Pakistan, Cyprus, Egypt, Israel. Important pest of stored legumes in Ethiopia, Iran, Egypt, Pakistan; very heavy infestations observed in Ethiopia.

Callosobruchus maculatus (F.), cowpea weevil. Chickpea, beans, cowpea. Ethiopia,* Iraq,* Israel, Iran, Pakistan, Egypt, Turkey. Major pest in Pakistan; some importance in Israel.

Spermophagus sericeus Geoff. Legumes. Israel, Jordan, Cyprus, Egypt. Occasionally important in Israel.

Buprestidae (flatheaded wood borers)

Pseudocastalia aegyptiaca (Gmel.). Structural timbers, flooring, furniture. Iran, Egypt, Arabia, Syria. Severe damage in Iran.

Cerambycidae (roundheaded wood borers)

Hylotrupes bajulus (L.), house longicorn, old-house borer. Construction timber, chiefly coniferous. Libya, Lebanon,* Egypt, Cyprus, Israel, Syria, Turkey, Greece, north Africa through Europe, other areas. Damaging in Cyprus and other areas.

Stromatium fulvum Villers (=*unicolor* Ol.). Construction woods, oak, ash, sycamore, willow, citrus. Lebanon,* Iran, Israel, Egypt, Turkey, Cyprus, U.S.S.R., other areas. Develops in dead or dying wood. Serious pest of construction timbers.

Cleridae (checkered beetles)

Necrobia rufipes (DeG.), red-legged ham beetle. Animal skins, stored meat, nuts, other stored products. Egypt, Iran. Severe pest in Iran.

Cucujidae (cucujid beetles)

Ahasverus advena (Waltl), foreign grain beetle. Stored products, farm grains. Iran, Pakistan, Egypt, India. Does not damage clean, dry grains.

Cryptolestes ferrugineus (Steph.), rust red grain beetle, rusty grain beetle. Grains. Turkey, Iran, Pakistan, Egypt, Tunisia, Greece, worldwide. Important pest in Turkey; minor pest in Pakistan.

Cryptolestes pusillus (Schön.). Stored grains. Turkey, Iran, Pakistan, Libya, Egypt, Tunisia, Morocco, cosmopolitan. Distribution seems to be limited by low temperatures and low humidity. Common in grains in Turkey; minor pest in Iran and Pakistan. Not a primary pest.

Cryptolestes spartii (Curtis). Flour. Turkey, Tunisia, Morocco, Europe.

Cryptolestes turcicus (Grouv.). Flour, stored products. Turkey, Iran, Tunisia, Egypt, northern and tropical Africa, Europe, cosmopolitan. Common in grain stores in Turkey; damaging in Iran.

Laemophloeus ater (Ol.). Wheat, barley, date. Libya, Egypt.

Oryzaephilus mercator (Fauv.), merchant grain beetle. Stored products. Turkey, Iran, Pakistan, Egypt.

Oryzaephilus surinamensis (L.), saw-toothed grain beetle. Stored grains, dried fruit, flour mills. Tunisia, Turkey, Cyprus, Libya, Egypt, Sudan, Ethiopia, Somalia, Iran, Iraq, Pakistan, Algeria, Morocco, cosmopolitan. Important pest in Tunisia and Turkey; serious damage in Lebanon and Iran; minor pest in Pakistan.

Curculionidae (weevils)

Sitophilus granarius (L.), granary weevil. Stored grains. Iran, Iraq, Libya, Ethiopia,* Somalia, Pakistan, Afghanistan,* Turkey, Cyprus, Egypt, Lebanon, Tunisia, practically cosmopolitan. Major pest in Turkey; important pest in Iran, Libya, Lebanon, Ethiopia, other areas; minor pest in Pakistan.

Sitophilus oryzae (L.), rice weevil. Stored grains. Egypt, Libya,* Turkey, Iraq, Lebanon, Israel, Cyprus, Tunisia, Somalia, Ethiopia,* Sudan, Greece, Afghanistan,* Pakistan, Iran, widespread in many areas of world. Major stored-grain pest in Turkey, Iran, Pakistan, Libya, Lebanon, Ethiopia. Called most destructive pest of stored grains; causes great loss in Ethiopia and elsewhere.

Dermestidae (dermestid beetles)

Anthrenus coloratus Reit. Caraway seed, stored animal products. Sudan, India.

Anthrenus flavipes LeC., furniture carpet beetle. Stored products. Iraq.

Anthrenus museorum (L.), museum beetle. Stored products including wool and skins. Iran. Larvae reported to cause important damage in Iran.

Anthrenus pimpinellae F. Stored products. Iran, Egypt. Larvae reported to cause important damage in Iran.

Anthrenus verbasci (L.), varied carpet beetle. Stored products. Turkey, Greece, Morocco, Libya, Egypt.

Attagenus alfierii Pic. Stores of drugs, myrobalan. Egypt.

Attagenus gloriosae (F.). Flour, grains, peanut. Libya, Egypt, Iran, east Africa. Occasional pest.

Attagenus lobatus Rosen. Stored products. Iran.

Attagenus megatoma (F.), black carpet beetle. Stored products. Turkey, Pakistan, Afghanistan,* Iran, Cyprus, Greece, Algeria, Morocco, nearly cosmopolitan. Serious pest in Iran and some other areas; common in grain stores in Turkey; minor pest in Pakistan.

Dermestes frischii Kug. Stored products. Iran, Libya, [illegible] Rated as very severe pest in Iran.

Dermestes lardarius L., bacon beetle, larder beetle. Stored products. Iran.

Dermestes maculatus DeG. (=*vulpinus* F.), leather beetle, hide beetle. Stored products, hides. Iran, Pakistan, Egypt. Rated as very severe pest in Iran.

Dermestes mustelinus Erichs. Stored products. Iran, Libya.

Trogoderma granarium Everts, khapra beetle. Stored grains, other stored products. Israel, Cyprus, Turkey, Tunisia, Libya,* Iran, Pakistan, Sudan,* Egypt, Afghanistan,* Ethiopia, India, Algeria, Morocco, parts of Europe. One of principal grain pests of Cyprus; major pest in Pakistan; important in southern Turkey; heavy losses in southern Iran; serious in Sudan.

Trogoderma versicolor (Creutz.). Stored products (mainly of animal origin). Cyprus, Egypt, Iran, Turkey, Europe, India. Considerable damage reported in Cyprus; rated severe in Iran.

Lathridiidae

Lathridius minutus (L.). Stored products. Turkey, Greece, Egypt, Morocco.

Lyctidae (powder-post beetles)

Lyctus africanus Lesne. Seasoned timber, drugs, ginger. Sudan, Egypt. Pest of native timber.

Lyctus brunneus (Steph.). Furniture. Ethiopia,* Greece. Heavy infestations reported from Ethiopia.

Trogoxylon impressum (Comolli). Furniture, wooden floors. Egypt. Injurious.

Mycetophagidae (hairy fungus beetles)

Typhaea stercorea (L.), hairy fungus beetle. Stored products, flour mills. Iran, West Pakistan, Turkey, Sudan, Somalia, Cyprus, cosmopolitan.

Nitidulidae (sap beetles)

Carpophilus sp. Date. Iran.* Heavy in ripening fruit.

Carpophilus dimidiatus (F.), corn sap beetle. Stored products, ripe and dried fruit. Sudan, Libya, Somalia, Cyprus, Turkey, Iran, Morocco, Pakistan, Egypt, widespread. Rated serious pest on fruit in Pakistan.

Carpophilus halli Dobson. Dried fruit. Turkey.

Carpophilus hemipterus (L.), dried-fruit beetle. Date, apple, fig, stored products. Libya, Lebanon, Egypt, Turkey, Cyprus, Iran, Pakistan, Saudi Arabia, Greece. Serious pest in Lebanon and Pakistan; important on date in Libya and fig in Turkey; minor pest in Iran.

Carpophilus mutilatus Erich. Guava fruit, stored products. Sudan,* Egypt.

Carpophilus obsoletus Erich. Stored grains, peanut, sesame, fruit. Israel, Pakistan. Important on fruit in Pakistan.

Ostomatidae (ostomatid beetles)

Lophocateres pusillus (Klug), Siamese grain beetle. Rice mills, stored grains, stored products. Pakistan, Egypt, widespread in subtropics and Tropics.

Tenebroides mauritanicus (L.), cadelle. Stored grains, other stored products. Turkey, Cyprus, Tunisia, Lebanon, Ethiopia,* Libya,* Somalia, Egypt, Sudan, Iran, Pakistan, Greece, widespread. Major pest in Turkey and Iran; minor pest in Pakistan.

Ptinidae (spider beetles)

Gibbium boieldieui Lavrat. Stored products. Iran. Some importance in Iran.

Gibbium psylloides (Czemp.). Stored products. Tunisia,* Egypt, Iran, Turkey, Pakistan, Libya. Rated as important pest in Iran.

Niptus hololeucus (Fald.), golden spider beetle. Stored products. Iran. Some importance in Iran.

Ptinus clavipes Panz., brown spider beetle. Stored products. Iran. Some importance in Iran.

Ptinus fur (L.), white-marked spider beetle. Stored products. Iran, Cyprus, Great Britain. Some importance in Iran.

Ptinus ocellus Brown. Stored products. Turkey, Britain.

Tenebrionidae (darkling beetles)

Alphitobius diaperinus (Panz.), lesser mealworm. Stored products. Tunisia, Turkey, Iran, Pakistan, Morocco, Algeria, Libya,* Egypt, widespread. Common in grain stores in Turkey.

Alphitobius laevigatus (F.), black fungus beetle. Stored products. Turkey, Iran, Afghanistan,* Pakistan.

Alphitophagus bifasciatus (Say), two-banded fungus beetle, waste grain beetle. Grains. Turkey, Egypt, Morocco, Algeria, cosmopolitan.

Cyphogenia lucifuga (Adams). Stored products. Iran.

Gnathocerus cornutus (F.), broad-horned flour beetle. Stored grains, flour, meal. Libya, Turkey, Tunisia, Egypt, Ethiopia,* Greece, cosmopolitan. Secondary feeder in Egypt.

Gonocephalum rusticum (Ol.). Stored products. Iran, Cyprus.

Gonocephalum setulosum Fald. Stored products. Iran, Cyprus.

Latheticus oryzae Waterh., long-headed flour beetle. Stored products, flour mills. Egypt, Sudan, Iran, Pakistan, Turkey, Tunisia, Libya, Morocco, cosmopolitan. Reported as severe in Iran; secondary pest in Pakistan.

Mosostena puncticollis Solier. Stored products. Iran.

Ocnera hispida (Forsk.). Stored products. Iran, Egypt.

Opatroides punctulatus Brullé. (See under Polyphagous Insects.)

Palorus ratzeburgi (Wiss.), small-eyed flour beetle. Stored grains and grain products. Turkey, Iran, Pakistan, Tunisia, Egypt, Greece, Algeria, cosmopolitan. Common pest in flour mills.

Palorus subdepressus (Woll.), depressed flour beetle. Stored products. Turkey, Tunisia, Egypt, Morocco, Algeria.

Tenebrio molitor L., yellow mealworm. Stored products. Turkey, Tunisia, Egypt, Libya, Iran, Pakistan, widespread. Some importance in Iran; minor pest in Pakistan.

Tenebrio obscurus F., dark mealworm. Stored products. Turkey, Tunisia, Algeria, Egypt, Morocco, Iran. Some importance in Iran; common in Turkey.

Tribolium castaneum (Hbst.), red flour beetle. Flour mills, stored wheat, barley. Egypt, Turkey, Cyprus, Iran, Pakistan, Afghanistan,* Lebanon, Algeria, Tunisia, Sudan, Ethiopia,* Somalia, Greece, Libya,* widespread. Serious in Sudan and Lebanon; principal pest in Iran and Pakistan; important in Turkey. This species and *T. confusum* considered worst pests of flour mills.

Tribolium confusum J. duVal, confused flour beetle. Stored products, flour mills. Turkey, Tunisia, Libya, Egypt, Sudan, Ethiopia, Pakistan, Iran, Israel, Lebanon, Greece, widespread. Serious in Sudan and Iran; common in Pakistan.

Tribolium destructor Uttem. Flour. Ethiopia.*

Diptera

Piophilidae (skipper flies)

Piophila casei (L.), cheese skipper. Cheese, cured meat. Libya, Egypt, Cyprus, Iran, Greece. Considerable importance in Iran.

INSECTS AFFECTING SPECIAL CROPS

Principal host crops: Castorbean (*Ricinus communis*), coffee (*Coffea* sp.), flax (*Linum usitatissimum*), safflower (*Carthamus tinctorius*), sesame (*Sesamum indicum*), tea (*Camellia sinensis*).

Acarina

Tenuipalpidae (=Phytoptipalpidae) (false spider mites)

Brevipalpus obovatus Donn. (See under Polyphagous Insects.)

Tetranychidae (spider mites)

Eutetranychus orientalis (Klein). (See under Citrus Insects.)
Tetranychus atlanticus McG. (See under Polyphagous Insects.)

Orthoptera

Acrididae (=Locustidae) (grasshoppers)

See following species under Polyphagous Insects:
Chrotogonus trachypterus trachypterus (Blanch.)
Cyrtacanthacris tatarica (L.)

Thysanoptera

Thripidae (thrips)

Frankliniella schultzei (Tryb.). *Guizotia abyssinica.* Ethiopia.* Noted infesting flowers.

Taeniothrips sp. near **simplex** (Morison). Flax. Ethiopia.* Heavy infestations observed.

Heteroptera

Lygaeidae (lygaeid bugs)

Aphanus sordidus F. (See under Insects Affecting Edible Legumes.)

Miridae (plant bugs)

Campylomma diversicornis Reut. (See under Polyphagous Insects.)

Pentatomidae (stink bugs)

Acrosternum pallidoconspersum (Stål). (See under Cotton Insects.)

Antestia lineaticollis (Stål). Coffee. Ethiopia,* east Africa. Feeds on berries, buds, leaves, green twigs. Major pest of Arabic coffee.

Antestia orbitalis (Thunb.). Coffee. Ethiopia.* Light infestations reported.

Antestiopsis intricata (Ghesg. & Carayon). Coffee. Sudan, Ethiopia, other areas of Africa. Feeds mostly on young berries.

Dolycoris indicus Stål. Safflower. West Pakistan. Minor pest.

Sphaerocoris annulus (F.). *Guizotia abyssinica.* Ethiopia.* Light infestations observed on this crop, which is grown for oilseed.

Veterna abyssinica Leth. Flax. Ethiopia.* Light populations observed.

Homoptera

Aleyrodidae (whiteflies)

Bemisia sp. False banana (*Musa* sp.). Ethiopia.* Light populations observed on this plant, which is cultivated for food.

Trialeurodes ricini (Misra). (See under Citrus Insects.)

Aphidae (aphids)

Acyrthosiphon sp. probably ***mordvilkoa*** Nevsky. Flax. Afghanistan.* Extremely heavy, damaging populations observed on terminals.

Dactynotus sonchi (L.). Safflower, chicory, various composites. Egypt, Iraq, Israel, Jordan, Lebanon, Turkey, Pakistan, other areas. Sometimes abundant on stem of safflower in Egypt; major pest on this crop in Pakistan.

Macrosiphum sp. False banana (*Musa* sp.). Ethiopia.* Light populations observed.

Asterolecaniidae (pit scales)

Asterolecanium bambusae (Bdv.). Bamboo. Egypt. Common on bamboo in Egypt.

Cicadellidae (leafhoppers)

Circulifer opacipennis (Leth.). (See under Insects Affecting Beets and Related Crops.)

Empoasca distinguenda Paoli. Castorbean, beans, corn. Sudan, Egypt, Israel, Italy. Importance apparently undetermined.

Orosius albicinctus Dist. Sesame. Iran.* Serious in Iran on leaves and stems; reported as one of most important pests on crop in 1957.

See also following species under Polyphagous Insects:

Empoasca facialis (Jac.)

Empoasca flavescens (F.)

Dactylopiidae (dactylopiid scales)

Oratococcus agavium (Dougl.) (=*Pseudantonina agaves* Chiar.). Sisal. Ethiopia. Feeding causes breakage of leaves.

Margarodidae (margarodid scales)

Icerya aegyptiaca (Dougl.). (See under Polyphagous Insects.)

Lepidoptera

Arctiidae (tiger moths)

Pericallia geometrica (Obth.). Castorbean. Ethiopia.*

Utetheisa pulchella (L.), crimson-speckled moth. Sunn hemp (*Crotalaria juncea*). Arabia, Afghanistan, Cyprus, Tunisia, Iran, Pakistan, India, Egypt, Iraq, Libya, Somalia. Important pest on this fiber crop.

See also following species under Polyphagous Insects:

Amsacta moorei (Butl.)

Diacrisia obliqua (Wlk.)

Pericallia ricini (F.)

Cosmopterygidae

Pyroderces simplex (Wlsm.). (See under Cotton Insects.)

Geometridae (geometrid moths)

Thalassodes digressa (Wlk.), castorbean geometrid. Castorbean. Somalia, Uganda, Zanzibar.

Gracilariidae (leaf blotch miners)

Acrocercops bifasciata Wlsm. (See under Cotton Insects.)

Acrocercops conflua Meyr. Castorbean. Egypt, Somalia, Uganda, Israel, Iraq. Mines leaves, sometimes injurious, especially to small plants.

Lymantriidae (tussock moths)

Euproctis convergens B.-Bak. Castorbean. Somalia.

Euproctis lunata Wlk. Castorbean. West Pakistan, India. Feeds on leaves.

Porthesia scintillans (Wlk.). Sunn hemp, flax. Pakistan. Minor pest.

Lyonetiidae

Leucoptera coffeella (Guer.), coffee leaf miner. Coffee. Ethiopia, east Africa. Minor pest.

Noctuidae (=Phalaenidae) (owlet moths)

Achaea catella Gn. Castorbean, citrus, other fruit. Egypt, Sudan, Ethiopia, Somalia, southern Africa. Larvae cause slight to heavy damage to castorbean in Sudan; some damage to citrus and other fruit by moth, which pierces fruit.

Achaea janata (L.), smooth castor caterpillar. Castorbean preferred, sugarcane, citrus. Pakistan, India, Australia, other tropical regions. Causes defoliation on castorbean; minor pest in sugarcane; some damage by moth, which pierces citrus.

Anomis sabulifera (Gn.), jute semi-looper. Jute, hibiscus. Pakistan, Sudan, Uganda, Aden, southern Africa. Light to moderate injury to jute in Pakistan.

Eublemma brachygonia Hmpsn. (See under Polyphagous Insects.)

Grammodes congenita Wlk. Castorbean. Sudan.

Grammodes geometrica (F.). Castorbean. Sudan, Egypt, Cyprus, Old World Tropics and subtropics. Damage reported from Sudan and some other areas.

Parallelia algira (L.). (See under Polyphagous Insects.)

Oecophoridae

Depressaria pimpinellae Zell. Aniseed. Turkey. Serious damage reported.

Olethreutidae (olethreutid moths)

Eccopsis wahlbergiana (Zell.). (See under Cotton Insects.)

Enarmonia pseudonectis Meyr. Sunn hemp (*Crotalaria juncea*). West Pakistan. Major pest.

Phycitidae

Phycita diaphana Staud. Israel, Iraq, Libya, Egypt, Algeria. Pest on leaves and inflorescence. May cause considerable damage.

Phycita fuscopilella Chret. Castorbean. Libya.

Phycita poteriella Zell. Castorbean. Libya, Egypt, Sudan. Feeds in and around florescence. Minor pest locally in Libya.

Pieridae (whites, sulfur butterflies)

Catopsilia florella (F.). Senna, cassia. Sudan, Uganda, Tanganyika. Larvae feed on leaves. Can cause severe damage to senna.

Pyralidae (pyralid moths)

Cornifrons ulceratalis Led. Sesame. Libya, Egypt.

Pyraustidae (pyraustid moths)

Antigastra catalaunalis (Dup.), sesame seedpod borer, sesame leaf roller. Sesame preferred. Israel, Iran,* Iraq, Cyprus, India, Aden, Pakistan, Somalia, Sudan, Egypt, Libya, other African areas, tropical Asia, southern Europe. Feeds on shoots, leaves, flowers, pods. Important pest in Somalia, Egypt, Pakistan, India.

Dichocrocis punctiferalis Gn. (See under Polyphagous Insects.)

Pyrausta meridionalis Staud. Mint. Iraq, Morocco.

Coleoptera

Bostrichidae (false powder-post beetles)

Apate indistincta Murray. Coffee, acacia, guava, some other plants. Ethiopia, east Africa. Adults bore into trunks and branches.

Bruchidae (seed beetles)

Pachymerus pallidus Ol. Senna. Sudan. Destroys seed. One of most important pests of crop in Sudan.

Buprestidae (flatheaded wood borers)

Sphenoptera arabica (Lap. & Gory). Castorbean. Sudan. Feeds in stems.

Sphenoptera ardens Klug. Castorbean, other plants. Egypt. Attacks trunks.

Sphenoptera fulgens Gory. Castorbean. Sudan. Feeds in stems.

Cerambycidae (roundheaded wood borers)

Agapanthia dahli (Richt.). Safflower, sunflower. Israel, other eastern Mediterranean areas. Larvae bore into stems.

Chrysomelidae (leaf beetles)

Aphthona euphorbiae (Schr.). Flax. Syria, Cyprus, Libya, Italy, other Mediterranean areas. Damaging on young plantings, may require reseeding.

Aspidomorpha infuscata Spaeth. Coffee, sweetpotato. Somalia, Kenya.

Longitarsus parvulus (Payk.). Flax. Cyprus, Italy. Damaging on young plantings.

Podagrica menetriesi Fald. Flax, hollyhock. Iran. Adults feed on leaves; larvae attack roots and germinating seeds.

See also following species under Polyphagous Insects:

Altica pyritosa Erich.

Aphthona whitfieldi Bryant

Hermaeophaga ruficollis (Lucas)

Curculionidae (weevils)

Larinus spp. (*L. ovaliformis* Cap., *L. syriacus* Gyll., *L. orientalis* Cap., *L. grisescens* Gyll.) Safflower. Israel, Turkey, some other nearby areas. Larvae feed on developing seed, destroying as much as 50 percent of yield.

Lixus speciosus Mill. Safflower. Cyprus, Israel, U.S.S.R. (Caucasus). Larvae bore into stem, making spindle-shaped gall; may reduce yield.

Rhynchites hungaricus (Hbst.) var. ***anatolicus*** Schisky. Rose. Turkey. Reported as causing 6-percent damage on rose grown for oil.

Scarabaeidae (scarabs)

See following species under Polyphagous Insects:

Anomala egregia Gahan

Anomala plebeja (Ol.)

Melolontha melolontha (L.)

Oxythyrea funesta (Poda)

Polyphylla fullo (L.)

Scolytidae (bark beetles)

Stephanoderes hampei (Ferr.), coffee berry borer. Coffee. Sudan, widespread in Africa. Serious injury to coffee in some areas.

Hymenoptera

Tenthredinidae (sawflies)

Ardis sp. Rose. Turkey. Causes about 15-percent damage on rose grown for oil.

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Asphondylia sesami Felt. Sesame. Aden, Uganda.

Tephritidae (=Trypetidae) (fruit flies)

Trypanea stellata Fuess. Safflower, *Carduus*, *Calendula*. Israel, India, U.S.S.R. (Ukraine). Maggots feed on soft seed, sometimes causing important loss.

INSECTS AFFECTING ORNAMENTALS

Acarina

Eriophyidae (eriophyid mites)

Aceria georghioui Keif. Carnation. Cyprus. Causes distortion of leaves and shoots.

Tetranychidae (spider mites)

Eurytetranychus buxi (Garman). Hedge. Iran.*

Thysanoptera

Phlaeothripidae (thrips)

Haplothrips cottei (Vuillet). Carnation. Egypt, Europe. Recorded as pest in Egypt.

Haplothrips gowdeyi (Frkl.). Dahlia. Ethiopia,* southern Africa.

Thripidae (thrips)

Taeniothrips dianthi Pries. Carnation. Egypt, Morocco, Europe. Heavy damage in some cases.

Thrips nigropilosus Uzel. Pyrethrum. Egypt, Europe. Damage to leaves.

Heteroptera

Lygaeidae (lygaeid bugs)

Metopoplax ditomoides (Costa). Hollyhock. Lebanon.* Heavy infestation on seed pods.

Tingidae (lace bugs)

Cysteochila delineata (Dist.). Papilionaceae. Afghanistan.* Heavy damage observed on ornamental shrubs in eastern Afghanistan.

Homoptera

Aleyrodidae (whiteflies)

Bulgarialeurodes cotesii (Mask.). Rose. Afghanistan,* India, Russia, Bulgaria, Turkey.* Heavy damage in Afghanistan and Iran.

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Dialeurodes kirkaldyi (Kot.). Ornamentals, citrus. Egypt, Pakistan, Syria, India.

Aphidae (aphids)

Acyrthosiphon porosum (Sand.). Rose. Libya, Egypt, Israel, many areas of world. May be abundant. Minor pest in Libya.

Aphis matthiolae Theob. *Matthiola*, radish. Egypt.

Aphis nerii Fonsc. *Asclepias* sp., oleander. Tunisia,* Libya,* Egypt, Israel, Iraq, Jordan, Lebanon,* Pakistan, Syria, Turkey, Somalia, southern Europe. Causes heavy damage to young growth and flowers.

Aphis umbrella (Bnr.). *Althaea*, *Malva*, other Malvaceae. Israel, Jordan, Turkey, Europe, U.S.S.R., central Asia. Damages *Althaea*, rolls leaves.

Aphis verbasci Schrk. *Buddleia*, *Verbascum*. Israel, Turkey, Egypt, Morocco, Libya, Europe. Considerable damage to young growth.

Brachycaudus sp. Cosmos. Afghanistan.* Heavy populations observed.

Brachycaudus helichrysi (Kltb.). Compositae, stone fruit. Israel, Egypt, Libya,* Lebanon, Syria, Turkey, Iran,* Afghanistan,* Pakistan, cosmopolitan. Causes deformation and wilting. Rated as serious in Lebanon, Syria, Pakistan on fruit; damaging infestations also reported from Iran and Afghanistan.

Coloradoa rufomaculata (Wils.). Chrysanthemum. Egypt, India, parts of Europe. Virus vector.

Dactynotus jaceae (L.). *Carduus*, *Centaurea*. Ethiopia, Somalia, Egypt, Israel, Turkey, Europe, central Asia.

Dysaphis tulipae (Fonsc.). Iris. Afghanistan (determined as probably this species),* Libya.*

Macrosiphoniella absinthii (L.). Chrysanthemum, other Compositae. Egypt, Israel, Europe, U.S.S.R. (Siberia), Morocco. Does not cause heavy injury.

Macrosiphoniella sanborni (Gill.), chrysanthemum aphid. Chrysanthemum. Egypt, Libya, Israel, Lebanon, Iran, Turkey, Afghanistan,* many other parts of world. Commonly infests leaves and stems.

Macrosiphum rosae (L.), rose aphid. Rose. Tunisia,* Egypt, Iraq, Lebanon,* Israel, Turkey,* Libya,* Iran, Afghanistan,* cosmopolitan. Some importance in Middle East.

Myzaphis turanica Nevsky. Rose. Israel, central Asia. Severe injury to buds in Israel.

Myzus certus (Wlk.). Pansy. Iran (specimens determined as probably this species).* Severe leaf curling reported.

Neomyzus circumflexus (Bckt.) (formerly in genus *Myzus*). Tulip, cyclamen, other ornamental plants. Iran. Attacks leaves and stems, causing medium to severe damage.

Asterolecaniidae (pit scales)

Asterolecanium fimbriatum (Fonsc.). Ivy, broom. Libya.

Cicadellidae (leafhoppers)

Edwardsiana rosae (L.), rose leafhopper. Rose, apple, pear, some other plants. Iran. Attacks underside of leaves, causing chlorosis.

Diaspididae (armored scales)

Aonidia lauri (Bouché). *Laurus* sp. Turkey,* Greece, Morocco. Very heavy, damaging infestations observed in Istanbul.

Aspidiotus hedericola Ldgr. Ivy, palms. Lebanon,* Europe.

Aulacaspis rosae (Bouché), rose scale. Rose preferred, some other Rosaceae. Iraq, Egypt, Iran, Greece, cosmopolitan. Attacks twigs and branches. Sometimes severe in Iran and other areas.

Diaspis carueli (Targ.-Tozz.), juniper scale. Juniper. Ethiopia.*

Unaspis euonymi (Comst.), euonymus scale. *Euonymus* spp. Turkey,* other areas. Severe damage in Turkey and elsewhere.

Lepidoptera

Danaidae (milkweed butterflies)

Panlymnas chrysippus (L.), plain tiger, Indian milkweed butterfly. *Asclepias*, *Calitropis*. Iraq, Uganda, Pakistan, Tunisia. Minor pest.

Geometridae (geometrid moths)

Scopula fulminataria (Turati). Carnation. Libya. Feeds on flowers.

Hesperiidae (skippers)

Carcharodus altheae insolatrix (LeCerf.), hollyhock skipper. Hollyhock. Iraq. Feeds on leaves.

Noctuidae (=Phalaenidae) (owlet moths)

Brithys crini (F.). Lily, *Ornithogalum*. West Pakistan, Uganda. Damaging.

Brithys pancratii (Cyr.). Lily. Sudan.* Medium infestation found mining in lily leaves.

Olethreutidae (olethreutid moths)

Rhopobota naevana (Hbn.), black-headed fireworm. Holly. Iran.* Feeds on new growth.

Sphingidae (sphinx moths)

Celerio euphorbiae (L.). *Euphorbia* spp. Tunisia.

Deilephila nerii (L.), oleander hawk moth. Oleander, gardenia, other ornamentals. Iraq, Libya, Egypt, east Africa. Local damage, where numbers large, in Egypt.

Coleoptera

Chrysomelidae (leaf beetles)

Monolepta sp. possibly ***cruciata*** Guer. Daisy. Ethiopia.* Light populations reported.

Phyllotreta corrugata Reiche. Stock, wallflower. Cyprus.

Curculionidae (weevils)

Apion longirostre Ol., hollyhock weevil. Hollyhock. Afghanistan,* Iran.

Pantomorus godmani (Crotch), Fuller rose beetle. Ornamentals. Egypt, Ethiopia. Found for first time in Egypt in 1941, in Eritrea (Ethiopia) in 1945.

Hymenoptera

Cephidae (stem sawflies)

Syrista parreyssi (Spin.). Rose. Iran,* Turkey. Damaging to rose grown for oil in Turkey.

Tenthredinidae (sawflies)

Arge ochropa (Gmel.) (=*Hylotoma rosarum* Klug). Rose. Iran. Larvae feed on leaves; adults damage plant by ovipositing inside young shoots. Severe pest.

Diptera

Cecidomyiidae (=Itonididae) (gall midges)

Dasyneura affinis (Kieff.), violet leaf midge, violet leaf rolling gall midge. *Viola* spp. Libya, Egypt, Morocco, Algeria, Europe. Serious damage to cultivated and wild violet by dwarfing and distortion.

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