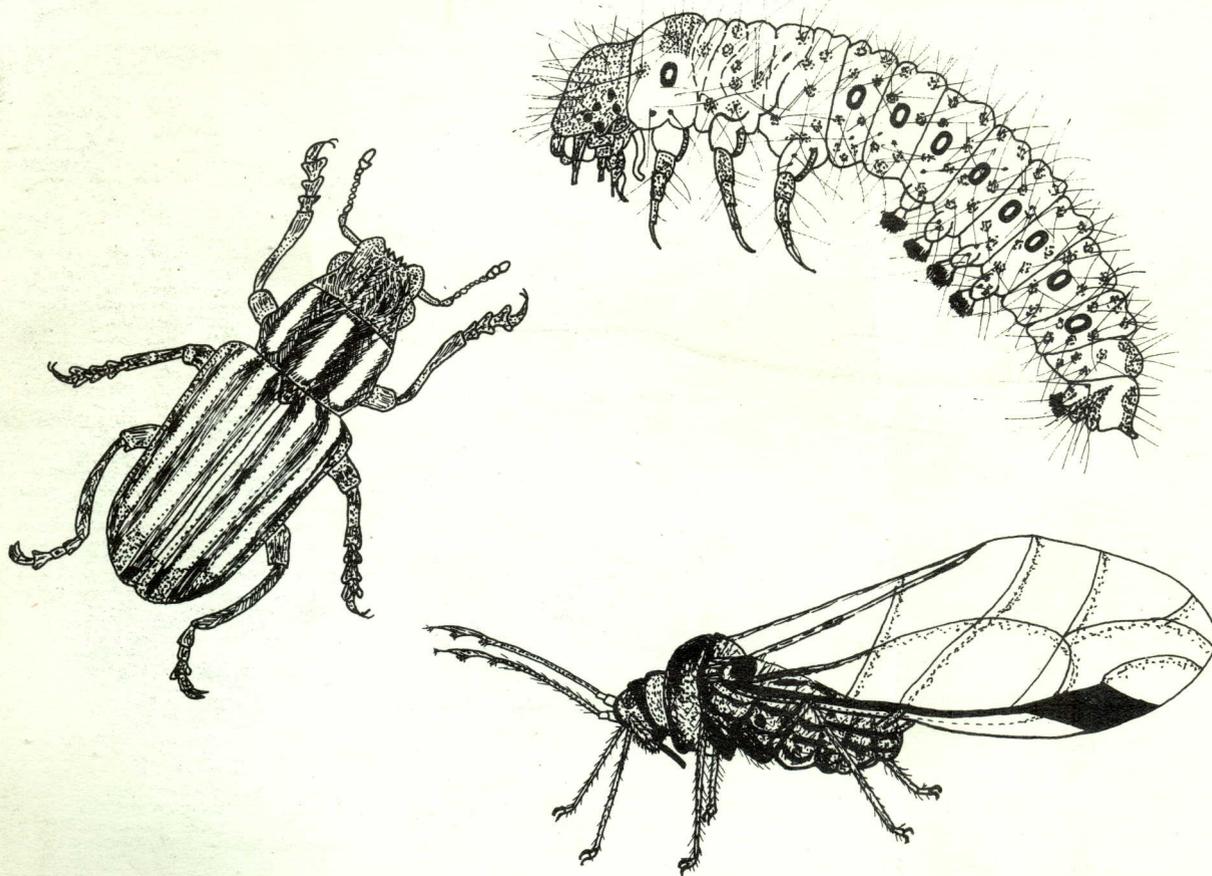


MAJOR INSECT PESTS OF FOOD LEGUMES IN THE NEAR EAST



TECHNICAL MANUAL NO:4

INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS

ICARDA

1978



*MAJOR INSECT PESTS
OF FOOD LEGUMES IN THE NEAR EAST*

ARA . A , KEMKEMIAN

TECHNICAL MANUAL NO: 4

INTERNATIONAL CENTER FOR AGRICULTURAL RESEARCH IN THE DRY AREAS

ICARDA

1978

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION	
Field Key	
HOMOPTEROUS PESTS	1
(i) Aphids	3
(ii) Leaf Hoppers	7
LEPIDOPTEROUS PESTS	9
(i) Armyworms	9
(ii) Cutworms	12
(iii) Pod Borers	15
COLEOPTEROUS PESTS	18
(i) Weevils	18
(ii) Bruchids or Seed Beetles	23
DIPTEROUS PESTS	26
APPENDIX I	30
APPENDIX II	32

INTRODUCTION

This manual has been prepared for use on the food legume training course at ICARDA. It is intended as an introduction to the major insect pests of important food legumes in the Near East, namely, broadbeans, lentils, peas and chickpeas.

Emphasis is placed on identification both by damage symptoms and of the insect itself. Biology, life cycle and control measures are also discussed.

Field Key for the Identification of Important Insects Injuring
the Major Pulse Crops of the Near East Based on Damage
Symptoms.

(a) Leaves and Stem

- | | |
|--|--------------|
| 1. Curled and stunted leaves; presence of tiny insects | Aphids |
| 2. Leaves yellowish, particularly near midribs; presence of tiny light-green mobile nymphs on underside of leaves..... | Leaf hoppers |
| 3. Leaves chewn; presence of a light green caterpillars with dark stripes (maximum length 30 mm) | Armyworms |
| 4. Mined leaves; presence of tiny white maggots inside..... | Leaf miners |
| 5. Leaves and stems chewn; presence of a greyish greasy color caterpillar (maximum length 45 mm)..... | Cutworms |
| 6. Crescent-shaped pieces eaten from margin of leaves | Weevils |

(b) Pods

- | | |
|---|------------|
| 1. Covered with tiny insects | Aphids |
| 2. Chickpea pod containing greenish to greyish caterpillars (maximum length 40 mm)..... | Pod borers |

(c) Seeds

- | | |
|---|----------|
| 1. Seeds with holes; presence of tiny caterpillars..... | Bruchids |
|---|----------|

HOMOPTEROUS PESTS

Of the phytophagous arthropods, the order Homoptera enjoys special economic importance in agriculture. Unlike members of the other orders whose feeding injury is almost entirely limited to the mechanical consumption of their food plants, homopterous insects and phytophagous Hemiptera cause damage to plants in one or more of four possible ways:

1. They all suck plant sap, thus weakening their hosts to the extent that the latter sometimes cannot mature their fruits, or are rendered more susceptible to the attack of secondary pests, especially borers.
2. Many sucking insects, while feeding, are capable of producing disease-like symptoms known as phytotoximia.
3. A large amount of honeydew is secreted by a number of species of Homoptera, on which a black fungus, known as "Sooty Mould" grows. This fungus covers the leaves and reduces their photosynthetic ability.
4. A number of species are incriminated as vectors of phytopathological micro-organisms, and particularly virus diseases.

Economic Damage

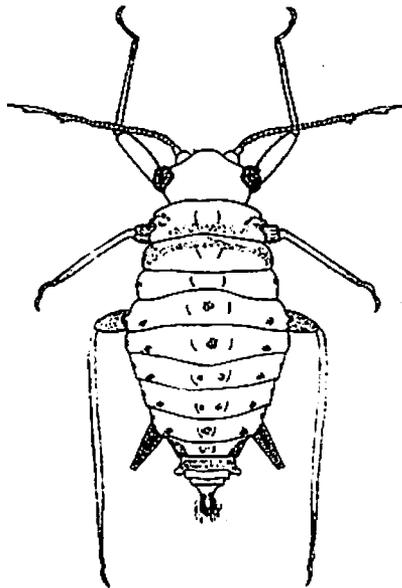


The sucking of plant sap by Aphids and other homopterous pests causes leaf and stem deformation. Infestation is easily detected from the large mass of insects present on the plant.

(i) Aphids

Order Hemiptera
Sub-Order Homoptera
Family Aphididae

Identification



BLACK BEAN APHID

APHIS FABAE

Life Cycle:

The life cycle of aphids can be extremely complicated, if compared with those of other phytophagous insects. The complication arises from the fact that aphids are genetically capable of exhibiting a high degree of polymorphism; they have a variety of modes of reproduction and in some cases have one or more obligate alternate hosts. They have two patterns of reproduction. In the anholocyclic pattern, aphids are able to reproduce parthenogenically (i. e. without sexual reproduction). The holocyclic pattern is more complex:

The critical winter time is passed in the (fertilized) egg stage on a tree or a shrub. In spring, the eggs hatch producing only apterous, viviparous, parthenogenetic females. As the season advances, an increasing percentage of alate individuals are produced in the succeeding generations.

These fly to a herbacious host plant, termed the summer or "Secondary host". Sometime, by the end of summer, a generation of winged females and males are produced that migrate back to the primary host. The parthenogenetic virginogenous females give birth, on the winter host, to larvae that will develop into oviparous sexual females. The male population of the fall migrants arrive on the winter host in time to copulate with the already sexually mature oviparous females, and the latter then lay their winter eggs on the primary host, thus closing the annual cycle.

Common aphids species on leguminous crops:

- Aphis (Doralis) fabae Scop.: This is the black bean aphid. It is highly polyphagous and feeds practically on all kinds of leguminous plants. The species seems to follow an anholocyclic pattern of reproduction in the Near East. It could be particularly serious on young broad-beans and bush beans from early spring to late summers. In spring, horse beans are practically attacked wherever they are grown, and in some seasons appreciable injury results.

- Aphis (Pergandeida) craccivora Koch: This is the black aphid. It is highly polyphagous and its food plants include a number of legumes, and different weeds. It has been reported that this aphid is an important vector of virus diseases on chickpeas in Iran.

- Acyrtosiphon onobrychis B. d. F. (= pisum Harris): This is the green pea aphid. It follows probably an anholocyclic life-pattern. It infests pea plants in fall, winter, and spring. Its injury to peas has never been very important in the countries of the Near East.

Control:

At least for the time being, aphids are easily controlled with contact aphicides and systemics. Chemicals like endosulfan, dimethoate, methyl demeton (Metasystox) and Dimecron give good results.

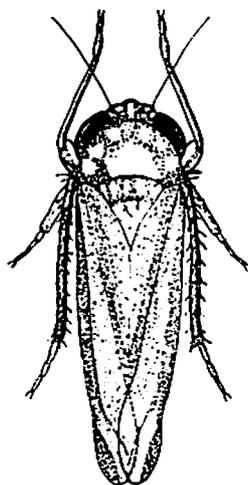
An early sowing date may help the plant to grow before heavy infestations in late spring.

Some broadbean genotypes show a considerable resistance to aphids and breeding work needs to be undertaken to attempt to transfer the resistance to locally adapted varieties.

(ii) Leaf Hoppers

Order Hemiptera
Sub-Order Homoptera
Family Cicadellidae

Identification



LEAF HOPPERS

EMPOASCA SP.

Leaf hoppers or jassids are very abundant in field crops. They are small, slender insects that rest in a position ready for jumping. The heads are blunt, the proboscis obviously issues from the head and the antennae are short.

Life Cycle

The life cycle is simple. Elongate eggs are deposited in longitudinal rows on stems, under the leaf sheaths or on the leaves. There are six instars and the wing rudiments are evident in the third instar. It takes around 20 days in summer and about 3 months in winter to complete a generation. Extreme temperatures are detrimental to your nymphs

Economic Damage

The damage caused by this insect can be heavy, especially on non-irrigated crops. They feed by sucking the cell sap from the leaves. Leaves of different plants respond in typical ways to the attack of the hopper. Some result in discoloration, others turn reddish and the leaf lamina wrinkle downwards, while others respond by partial or complete yellowing of the leaf blade. Moreover, leaf hoppers are virus transmitters thus causing an indirect disease problem.

One of the common species attacking leguminous crops in the Near East is Empoasca lybica de Bergevin.

Control

Leaf hoppers are easily controlled by contact or systemic insecticides. In case contact insecticides are used, the insecticides should be sprayed on the underside of the leaves in order to reach the nymphs and kill them.

LEPIDOPTEROUS PESTS(i) Armyworms

Order	Lepidoptera
Sub-Order	Ditrysia
Super -Family	Noctuoidea
Family	Noctuidae

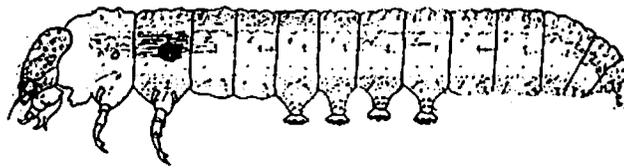
Laphygma (Spodoptera) exigua Hbn.

The insect is widely distributed in the world, and its caterpillars live on a large number of cultivated and wild plants. Due to the extent of its distribution, and the fact that it does not have a period of obligate diapause, this insect may pass the winter as a moth, a caterpillar (e. g. Ras Tannura on the Persian Gulf), or a Pupa (in Lebanon and Syria), depending on weather conditions. The extent of damage in all cases varies in different years, probably due to the migratory habit of the adult (Wiltshire 1957).

Identification

The adult is 25 to 30 mm across the wings. The forewings are ochreous grey with yellow and black scales scattered throughout. Parallel double zigzag lines run along the outer margin. The egg is about 0.5 mm in diameter, spheroidal in shape and of a light greenish color when first laid; as incubation proceeds, its color becomes light brown. The caterpillar is light green, with conspicuous darker stripes running on the entire length of

the sides and back of its body. It reaches a maximum length of 30 mm. When the caterpillars of this moth live gregariously they often assume a darker color. The general color of the pupa is brownish, except for the abdomen that shows a light green tinge.



ARMY WORM

LAPHYGMA SP.

Life Cycle

Upon emergence, adults of both sexes seem to be sexually mature. About one day after copulation the female begins to lay in large batches, usually surpassing 100 eggs, which she then covers with abdominal scales. A female lives approximately 10 to 20 days, depending on weather conditions, and during this time she will lay more than once. The incubation period is short, generally not exceeding 5 days. In about 10-12 days the caterpillars attain their full size and retire into the soil at fairly shallow depths to construct a cell in which they pupate. The duration of the pupal period varies between 6 and 10 days after which the moths start to emerge. The number of generations per year is probably five.

Economic Damage

Feeding takes place almost entirely at night, and the caterpillars retire during the day to hide in the soil at the base of their host plant. The young caterpillars eat the leaf lamina, avoiding the midrib and the larger veins. The older caterpillars eat the whole leaf and even the tender stems when forced to.

Control

Caterpillars of this moth can be controlled by most contact insecticides (except parathion) or by stomach poisons, first applied when signs of feeding on leaves appear.

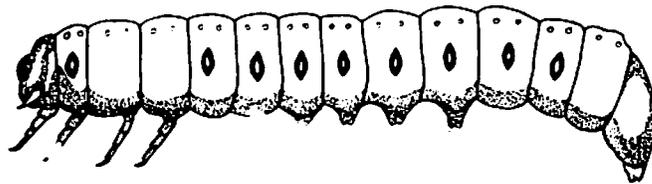
Weed control is important because some weeds are alternate hosts for the laphygma and are preferred for egg laying.

(ii) Cutworms

Order	Lepidoptera
Sub-Order	Ditrysia
Super-Family	Noctuoidea
Family	Noctuidae

Cutworms are caterpillars of several species of noctuid moths. They inhabit the surface layers of the soil and are voracious and polyphagous feeders on plants just above or below the soil surface. Crops suffer specially in the seedling stages. Small populations are always present in arable land and local outbreaks sometimes occur.

Identification



CUT WORM

AGROTIS SEGETUM

The adult is a grey-brown moth, measuring about 35-45 mm across the wings. The egg is whitish in color at first then changes to darker colors as incubation proceeds. The full-grown caterpillar is 40-45 mm long, of a greyish greasy color and is practically devoid of hair on its body. The pupa is brown, glossy, and measures about 25-30 mm in length.

Life Cycle

The insect overwinters in the soil, either in the pupal stage, or as a full-grown or partly-grown caterpillar. Depending on the stage in which it overwintered, the insect either transforms directly into a moth or a pupa, or continues its feeding as a caterpillar. After copulation, there seems to be a necessary preoviposition period, that varies with the reciprocal of the environmental temperature. The oviposition period extends over several days to about two weeks. The incubation period also varies inversely with temperature, extending from 3-12 days.

Economic Damage

The newly-hatched larvae feed by chewing holes in the leaves of their food plants. They climb on the plants at night, and hide in the soil during the day. In the soil the larvae are found coiled when not feeding. As they advance in age, especially after the second moult, they lose the ability to climb. This leads them to feed on the stems of the plants. They cut the stem below the surface of the soil, nibble at it a bit, leave it to wilt, then attack another plant. It is during this stage that they become most harmful; the larvae will have to eat a large number of stems in order to reach maturity. As the larva completes its growth, it constructs a sort of a cell in which it later transforms into a pupa. The length of the pupal stage varies greatly;

it is about eight days in summer, and extends more than two months in the winter. Hence the duration of one generation varies from less than five weeks to about 10 weeks.

Several species of cutworms are known. The most common are:-

<u>Agrotis ypsilon</u>)	
<u>Agrotis segetum</u>	(on chickpeas
<u>Agrotis flammatra</u>)	
<u>Agrotis spinifera</u>	(on beans
)	

Control

Poison baits may be used to kill cutworms because they have unspecialized feeding habits and wander over the soil surface. B. H. C. and bran or beetpulp (1 kg: 25 kg) moistened with water should be broadcasted over the affected parts of fields at 30 - 40 kg per ha. in the afternoon to keep the bait moist. This gives more than 80% control.

(iii) Pod Borers

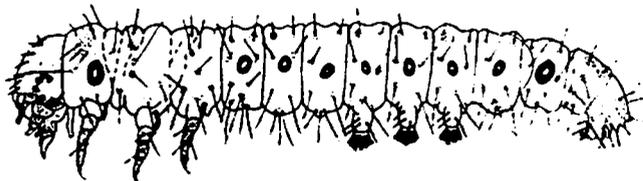
Order Lepidoptera
Sub-Order Ditrysia
Super-Family Noctuoidea
Family Noctuidae

Heliothis armigera Hb (obsoleta F.)

The species is known to be a migrant and is widely distributed throughout the world. Its caterpillars are highly polyphagous and intra-specifically cannibalistic. In the Near East, its economically important food plants are chickpeas, sweet corn, maize, cotton and tomato.

Identification

The adult is a moth about 20 mm long, and has a wing expanse of 37-40 mm. Its front wings are light tan, with a superimposed darker pattern of rather suffused nature. The eggs are hemispherical and longitudinally striped. The caterpillar reaches a length of 38-40 mm. Its color is highly variable, ranging from green to almost black. The pupa is light amber to chestnut brown.



POD BORER

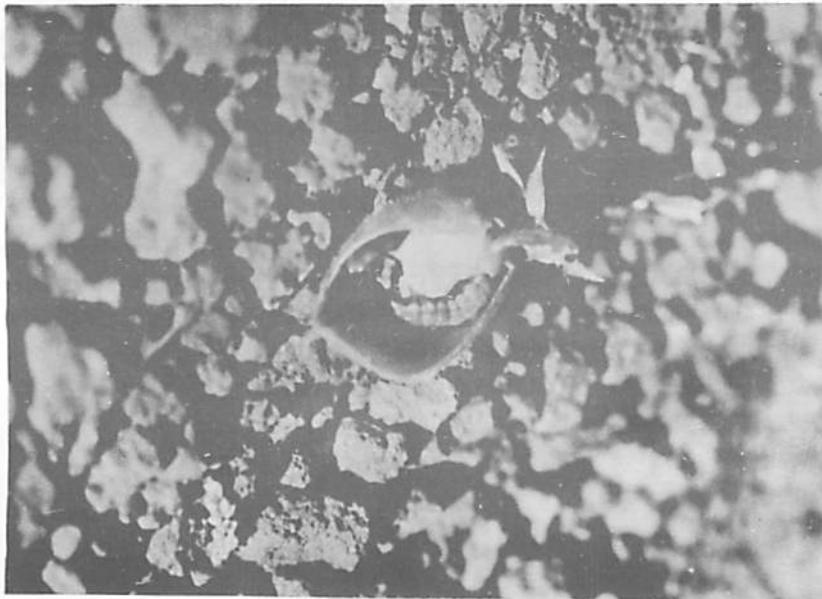
HELIOTHIS SP.

Life Cycle

Around the end of April/beginning of May, adults of H. armigera emerge in a sexually mature state. They copulate shortly after emergence and begin to lay their eggs singly on the food plant. A female lays on the average about 600 eggs in a period of 2-3 weeks. Incubation generally takes 3 to 5 days, after which the emerging caterpillars feed briefly on the leaves of the food plant, before boring into the fruit. The larval period is completed in about 20 to 25 days and is followed by pupation. The greater majority of caterpillars leave the attacked plants and pupate in smooth-walled earthen cells, some 8 to 12 cm below the soil surface.

Economic Damage

Damage results from the larvae consuming the fruit within the pods. A typically infested pod is shown below.



Control

Control of this insect is rendered difficult due to the large number of hosts it attacks. Chemical control should be done early in the growing season with stomach or contact poisons. Guthion was found to be effective against this pest.

Screening for resistant varieties of chickpeas was carried out at the Indian Agricultural Research Institute (IARI) and 50 lines showed less than 5% damage of pods. Similar experiments are carried out at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). However, further screening should be done before any recommendations can be made.

COLEOPTEROUS PESTS(i). Weevils

Order	Coleoptera
Sub-Order	Polyphaga
Super-Family	Curculionoidea
Family	Curculionidae

This group contains a large number of species which are pests of leguminous crops. The larvae are mostly concealed feeders either in soil feeding on roots and nodules, in plant tissue, in unopened flower buds, or in seeds.

The following species attack leguminous crops:

Sitona lineatus (L.); S. hispidulus (F.); S. crinitus (Herbst.); S. puncticollis Steph.; S. humeralis Steph.; S. flavescens (Marsh.); S. sulcifrons (Thumb.).

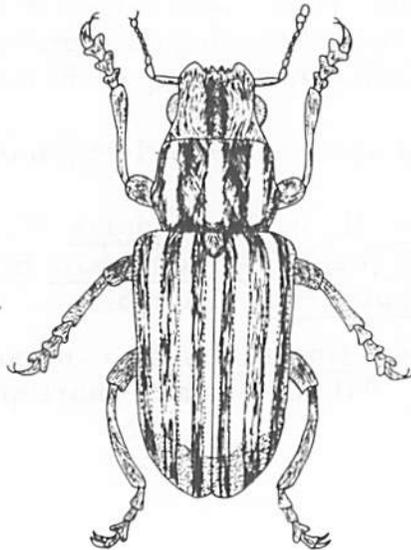
Of these Sitona lineatus is the commonest and is a serious pest of peas. All species are short snouted and are 3-6 mm long.

Sitona lineata (L.)

This is the pea leaf weevil. The list of food plants of this insect includes many economically important leguminous species of the following genera: Pisum, Vicia, Medicago, Trifolium, Lathyrus, etc..

Identification

The adult is almost black, but is covered by a dense coat of short hair that gives it a greyish to brownish-grey color. Its body is narrow, its head is blunt, and its clavate antennae are elbowed in the middle. The egg is oval, yellowish white at first, then becomes darker as embryonic development proceeds. The larva is legless, whitish, and bears a number of stout, brownish hairs and spines on all segments of its arched body. The thin cuticled pupa is yellowish and varies between 3.5 and 5.5 mm in length. It reacts quickly and obviously to touch stimuli.



PEA AND BEAN WEEVIL

SITONA LINEATUS

Life Cycle

The insect passes the winter in a state of diapause, in the adult stage. As soon as the soil temperature warms up in the spring, they are among the earliest insects to become active.

Copulation takes place about two weeks after the appearance of the overwintering adults in the field. A female lays for several weeks, and may lay more than 1000 eggs during its life time. The incubation period varies with temperature and humidity is important for embryonic development and egg hatching.

The newly hatched larva is very active. It creeps quickly in the soil and seems to be attracted to the nitrogen-fixing bacteria nodules on the roots of the food plant. The larval stage requires about three to four weeks for its completion. The pupal stage is passed in a well compacted earthen cell, built about two to five centimeters below the surface of the soil. The pupal period requires between 10 to 15 days for its completion.

Damage to Plants

The main damage is caused by the adult insects and consists of highly characteristic U-shaped notches cut from the edges of the leaves. These notches may occur all the way around the leaf margins.

The larval stage will attack the roots of many legume crops.



Typical Leaf damage caused by adult
Sitona weevils

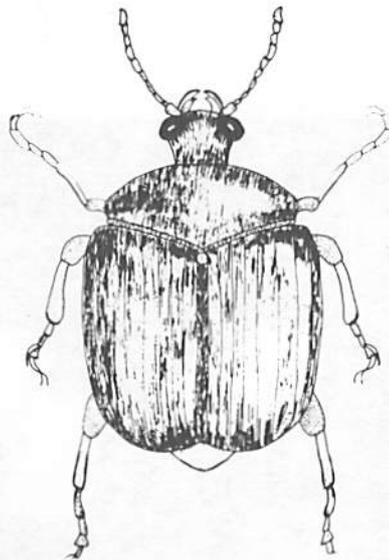
Control

The insect is easily controlled by the application of a dipterex spray or dust at the rate of 0.5 to 0.75 kg of active ingredient per hectare, when the adults appear in spring on the newly germinating plants.

(ii) Bruchids or Seed Beetles

Order	Coleoptera
Sub-Order	Polyphaga
Super-Family	Chrysomeloidea
Family	Bruchidae

Identification



SEED BEETLE

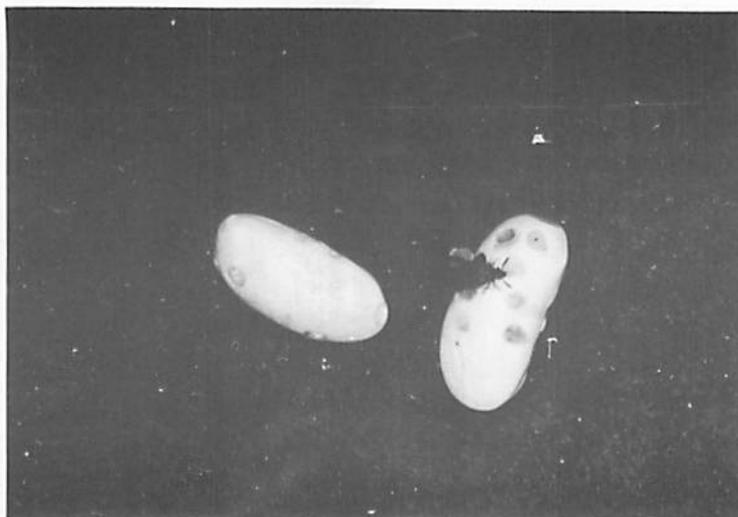
BRUCHUS RUFIMANUS

Life Cycle

The adult flies readily and is common in the spring, specially at flowering time. The eggs are laid on the young pods and the newly emerged larvae bore their way into the developing fruit and reach the seeds. More than one larva may enter the same seed. The rest of the life cycle is completed in the seeds until the adults bite their way out after pupation. At harvesting some of the beetles may be transferred from the field to the store where further bruchid generations will develop.

Economic Damage

This is caused by the larvae living in the seeds and may result in complete mining of the seed. Infestations during seed storage may cause total loss of the stored grain, the typical symptoms are shown below:-



Important Species Attacking Legumes

- Pea Beetle - Bruchus (= Mylabris) pisorum (Linne)
Broadbean beetle - Bruchus (= Mylabris) rufimanus Boh
Bean beetle - Aconthoscelides (= Mylabris or Bruchus)
obtectus (Say)
Cowpea beetle - Callosobruchus maculatus (Fabricius)
(= Bruchus quadrimaculatus)

Control

Control may be achieved by clean cultivation and crop hygiene. Field sprays with diazinon, dimecron, B.H.C. and thiodan proved to be effective. Seeds should be treated directly after harvest and before storage. This can be done by fumigation.

Release of male sterile bruchids has been considered as a possibility for biological control.

In a screening program for the Regional Pulse Improvement Project (RPIP), the chickpea cultivar G 109-1 was not preferred for oviposition by some Bruchids because of its rough seed coat. This phenomenon could be very helpful in introducing resistance especially that this seed character can be easily transferred to other cultivars.

Bruchid resistance was also reported in lentils but it may be of no use to breeders because of its association with poor cooking quality.

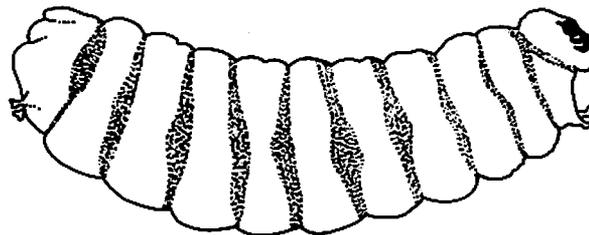
DIPTEROUS PESTSLeaf Miners

Order	Diptera
Sub-Order	Brachycera
Super-Family	Opomyzoidea (Pallopteroidea)
Family	Agromyzi dae

Leaf miners are small flies the larvae of which mine through leaves, stems and shoots.

Identification

The adult is a blackish fly about 2.5 mm in length. The egg is pearly white and oval. The larva is typically muscoid in appearance, white to cream white in color, and reaches a maximum length of 4 mm. The puparium is yellowish to light brown and measures 3 mm.



LEAF MINER

LIRIOMYZA SP.

Life Cycle

The duration of the different stages of this pest is influenced by temperature. The fly is capable of producing a number of generations per year. In summer, the insect completes one generation in about 12 days, while in autumn the larval period varies between 10 and 12 days, and the pupal period between 9 and 14 days.

The adult lays its eggs in the tissues of the leaves on the upper surface. Eggs may be inserted in the veins of the leaves or its parenchyma. On hatching the larva mines through the leaf until it reaches the stem of the plant. When it reaches the stem, it is usually a fullgrown larva. It makes its way down the stem to a distance of about 5-10 cms above the ground. Usually several larvae pupate together in the stem. At the time of pupation, light brown lesions appear on the stem where the pupa are formed. Soon the attacked plants wilt or even break down.

Economic Damage

The larvae mining through the leaves produce the characteristic symptoms shown below.



Important Species Attacking Legumes

There are many species of leaf miners attacking leguminous crops in the Near East. The most important are:

Melanagromyza phaseoli = The bean fly

Liriomyza trifolii = The broad bean fly

Liriomyza cicerina = Chickpea fly

Phytomyza atricornis = Pea fly

Control

Chemical control is achieved by using contact and systemic insecticides at the early stages of the crop.

LIST OF IMPORTANT INSECTS/PESTS REPORTED ON LEGUMINOSAE IN THE NEAR EAST

Order	Sub-Order	Super-Family	Family	Genus	Species	Common Name	Host(s)
Orthoptera	Ensifera	Grylloidea	Gryllotalpidae	Gryllotalpa	gryllotalpa	Mole cricket	Most legumes
Hemiptera	Homoptera	Aphidoidea	Aphididae	Aphis = Doralis	fabae	Bean aphid	Broadbeanbushbean
Hemiptera	Homoptera	Aphidoidea	Aphididae	Aphis	craccivora = laburni	Black aphid	Most legumes
Hemiptera	Homoptera	Aphidoidea	Aphididae	Acyrtosiphon = Macrosiphum	onobrychis = pisum	Pea aphid	Peas, vetch, sweet clover.
Hemiptera	Homoptera	Aphidoidea	Aphididae	Therioaphis	trifolii	Clover aphid	Bur clover, Berseem, Crimson clover.
Hemiptera	Homoptera	Cicadelloidea	Cicadellidae	Empoasca	lybica	Leaf hopper	Most legumes.
Coleoptera	Polyphaga	Chrysomeloidea	Bruchidae	Bruchus = Mylabris	rufimanus	Bean beetle	Broad beans.
Coleoptera	Polyphaga	Chrysomeloidea	Bruchidae	Bruchus	pisorum	Pea beetle	Peas.
Coleoptera	Polyphaga	Chrysomeloidea	Bruchidae	Acanthoscelides = Bruchidius	obtectus	Dried bean beetle	Dried bean.
Coleoptera	Polyphaga	Chrysomeloiden	Bruchidae	Callosobruchus = Bruchus	maculatus = quadrimaculatus	Cowpea beetle	Cowpea.
Coleoptera	Polyphaga	Chrysomeloidea	Bruchidae	Bruchus	analis	Lentil beetle	Lentils
Coleoptera	Polyphaga	Curculionoidea	Curculionidae	Sitona	lineata	Pea and bean weevil	Pea, bean, clover, lucern.
Coleoptera	Polyphaga	Curculionoidea	Curculionidae	Phytonomus = Hypera	Variabilis = postica	alfalfa weevil	Alfalfa

Order	Sub-Order	Super-Family	Family	Genus	Species	Common Name	Host(s)
Coleoptera	Polyphaga	Curculionoidea	Curculionidae	Apion	arrogans	Seed Weevil	Broadbeans, lentils.
Lepidoptera	Ditrysia	Papilionoidea	Lycaenidae	Lyceana	baetica	Bean butterfly	Bean, pea, cowpea, Vetch.
Lepidoptera	Ditrysia	Noctuoidea	Noctuidae	Laphygma = Spodoptera	exigua	Army worm	All legumes
Lepidoptera	Ditrysia	Noctuoidea	Noctuidae	Prodenia	litura	Cotton leaf worm	Alfalfa
Lepidoptera	Ditrysia	Gelechioidea	Gelechiidae	Aproaerema	alfalfella	Lesser alfalfa moth	Alfalfa
Lepidoptera	Ditrysia	Noctuoidea	Noctuidae	Agrotis	ypsilon	Greasy cutworm	All legumes
Lepidoptera	Ditrysia	Noctuoidea	Noctuidae	Heliothis	armigera = obsoleta	Pod borer	Chickpea
Lepidoptera	Ditrysia	Tortricoidea	Olethreutidae	Laspeyresia	nigricana	Pea moth	Peas
Diptera	Brachycera	Opomyzoidea	Agromyzidae	Melanagromyza = Agromyza	phaseoli	Bean fly	Beans
Diptera	Brachycera	Opomyzoidea	Agromyzidae	Phytomyza	atricornis = horticola	Pea fly	Peas
Diptera	Brachycera	Opomyzoidea	Agromyzidae	Liriomyza	trifolii	Broadbean fly	Broadbean
Diptera	Brachycera	Opomyzoidea	Agromyzidae	Liriomyza	congesta	Chickpea fly	Chickpea
Diptera	Brachycera	Opomyzoidea	Agromyzidae	Agromyza	nana	Alfalfa fly	Alfalfa

G l o s s a r y

- Alate = Winged.
- Anholocyclic = A life cycle pattern with parthenogenetic reproduction without the appearance of sexual forms and winter eggs.
- Apterous = Wingless
- Cannibalism = The eating of members of its own species.
- Clavate = A type of antenna; gradually thickening near the distal end.
- Contact poisons = The chemical which is picked up on the surface of the organism from the substrate, enters the body through the undifferentiated cuticle or the ensillae. This then destroys a vital physiological process, leading to the death of the pest. Examples: Diazinon, Dipterex, Dursban, Endosulfan, Sevin.
- Copulation = The sexual union of two individuals, resulting in insemination or deposition of the male gametes in close proximity to the female gametes.
- Diapause = A period of spontaneously suspended growth or development.
- Embryonic development = The formation and development of the organism from the zygote or fertilized egg.
- Gregarious = Living together in a community but not forming a true colony
- Holocyclic = A life cycle pattern where an extended parthenogenetic reproduction is interrupted by the appearance of functional sexual individuals and the species overwinter only in the fertilized egg stage.

- Incubation period = The brooding period required to bring an egg to hatching.
- Instar = A stage between molts in the life of an insect
- Migrant = Moving from one habitat to another
- Moult = To shed or cast off the old cuticle
- Oviparous = Producing eggs that develop and hatch externally
- Parthenogenesis = A special type of sexual reproduction in which an egg develops without entrance of a sperm
- Phytophagous = Feeding on plants
- Polymorphism = Occurrence of different structural forms in a single individual at different periods in the life cycle
- Puparium = The outer shell formed from the larval skin that covers a coarctate pupa
- Pupation = To develop into a pupa; to pass through a pupal stage
- Stomach poisons = The chemical enters by the mouth, is absorbed through the intestine and causes the death of the organism. A special class of stomach poisons are the systemic poisons. They are soluble in plant lipoids and as such are absorbed and translocated throughout the plant. They are thus especially effective for sap sucking pests.
- Viviparous = Bringing forth live youngs
- Voracious = Excessive appetite