

**MORPHOLOGICAL AND BIOLOGICAL NOTES OF INSECT  
PESTS ATTACKING FRUIT CROPS IN AL-QASIR DISTRICT  
KARAK - JORDAN**

**S. Y. Al-Abbadi**

College of Agriculture, Dept. of plant production, University of Mu'tah-Karak-  
Jordan

(Received, Dec., 4, 2001)

---

**ABSTRACT:** *The present study covered all areas cultivated with fruit trees in Al-Qasir district Karak-Jordan. These areas represented about 3% (1269.4 hectares) of the total areas of Al-Qasir district.*

*The study was conducted during the period elapsed between 1996 and 1998. During this period, 18 species of insects, belonging to 5 orders represented 15 families, were collected and their biology was studied. Four of these species were found attack olive trees, two attacking grape vine, two were attacking fig trees, two were attacking apple trees, two were attacking pomegranate trees, one was attacking almond, and five were attacking more than one fruit crop .*

*Environmental factors prevailing in the studied area were recorded, in order to clarify the insect life cycle and yearly generations.*

**Key Words:** *Morphological and biological notes, Fruit trees.*

---

**INTRODUCTION:**

The fruit trees in Al-Qasir district-Karak-Jordan have been attacked by several insect pests, causing large losses of fruit and lowering its market value (El-Mosa, 1981). Fruit trees have a long production period, within which they are subjected to various biotic and abiotic harmful factors. The most important of which are insects, particularly those which have destructive action on the assimilation organs of the plants.

The study was carried out in Al-Qasir district-Karak which covers an area about 42313.2 hectares, laying between longitude 35<sup>o</sup>-45' latitude 31<sup>o</sup>-16'. The average rainfall 385mm/year in high lands which have an altitude around 700-1000 m (Al-Qasir epartment of Agriculture; 1998).

The aim of the present work is to cover species of insects prominent in the study area and to give detailed observation on their biology and life cycle, to enable further research aiming at their biological control, and to avoid the use of chemical pesticides, which may endangare both the human health and the environment.

In order to achieve this aim, this work was conducted to provide information concerning morphology, biology and hosts of some pests in the

**S. Y. Al-Abbadi**

studied area, there were no studies or researches has been done in the area up to date (Sharaf; 1987).

## **MATERIALS AND METHODS**

The present study was carried out in Al- Qasir district, Karak-Jordan. Fruit trees different orchards were examined weekly and harmful insects were collected by hands, aerial net traps , aspirator, sex pheromone traps, light traps and colour traps. Several methods were used for killing, mounting and preserving.

Infested fruit trees were subjected to close observation and studies in both field and laboratory. Different size of mesh wooden cages, Muslin clothes and large glass containers used in field under natural conditions and in laboratory. Insects were examined daily to monitor period of different life stages and to observe their biology and determine number of generations in each year.

Some insects identification was confirmed by different specialists in international Institute of Entomology and Zoology in Austria (Institut fur Zoologie der Universitate, Innsbruck) and Germany (Lehrstuhl Fur Angewandte Zoologie Der ludwig-Maimilians-Universitat-Munchen)

## **RESULTS AND DISCUSSION**

Insect species arrangement and taxonomy were based on the analytical key used by (Borror, et al;1989) weekly field observations date provide us with different life stages for insect species attack Fruit trees in study area. under natural field condition were also shown below.

### **I. HOMOPTERA**

#### **A. PSYLLIDAE**

##### **1. *Euphyllura olivina* Costa (Olive psylla)**

**Host plant:** Olive.

**Egg:** Oval with pedicel; yellow to green in colour.

**Nymph:** Oval-shaped, wing pads occur during second larval instar, nymphs are covered with waxy white material like cotton, last nymphal instar 1.5mm long .

**Adult:** Yellow to greenish brown in colour, wings covered with small brown spots and held roof like during rest, it is 2.5mm long.

**Biology:** In studied area the species produces only two generations a year, the overwintering is possible at every stage. This is in agreement with the results of (Bene, et al;1997).The adult emerged from late April and complete first generation towards late May on buds and flowers, second generation started from late May to early August on fruit. Female deposits egg masses

***Morphological and biological notes of insect pests attacking.....***

on the buds and leaves during early March to hatch within two weeks. Nymphs have 5 instars that feed for 5 weeks on plant juice and cover themselves with white waxy material and secreting honey dew (Mustafa, and Najjar;1985).

**B. APHIDIDAE**

**2. *Aphis punicae* Passerini**

(Pomegranate aphid)

Host plant: Pomegranate.

Egg: Oval, bright white in colour.

Nymph: Olive green to yellow in colour resembles parent.

Adult: Alate forms thorax and head black in colour, abdomen green to yellow, siphunculi black. Apterous forms yellow to green, siphunculi small with setae. It is 2 mm long.

Biology: More than 20 generations a year overwinters in egg stage, nymphs occur from early March and April (Karuppuchamy, *et al.* 1998) then produce parthenogenetically.

**C. COCCIDAE**

**3. *Ceroplastes rusci* L.**

(Fig wax scale)

Host plant: Figs.

Egg: Oval cylindrical-shaped; early stages yellow and later stages red in colour, it is 0.27mm long.

Nymph: 0.32mm in length, with three instars, early instar with three pairs of legs and covered with waxy scale, Last instar star shaped with 15 white waxy appendages.

Adult: Female size (4x3.5mm) covered with white waxy scale hemispherical shaped with 8-sheets; upper sheet the largest one, winged male occurs rarely with white wings and body red in colour. It's 1.3mm long.

Biology: This species in studied area showed only two generations a year, spend the winter as an adult (female); and egg or second nymphal stage (Talhouk, 1969). Female lays around 1000 eggs parthenogenetically under it is wax scale during late April and early May for first generation and during June for second generation, life cycle short take about 40 days, eggs occupied a period of 5 days , hatching nymphs lasted 35 days.

**4. *Parasaissetia oleae* Bern**

(Black olive scale)

Host plant: Olives.

Egg: Oval-shaped, first white turns to dark, it is 0.3mm long .

**S. Y. Al-Abbadi**

**Nymph:** Oval shaped two instar, first nymphal instar 0.4mm long with six-segmented antennae, second instar 0.8mm long and 6-segmented antennae, and waxy material with a distinctive (H) shape mark on back.

**Adult:** Oval, elongate-shaped black to deep-coloured, (5x2.5mm) in size, antennae 8-segmented, female covered with brown waxy material; distinguished with H-shaped letter dorsally.

**Biology:** Studied area showed two generations a year for this insect, it spends the winter in second nymphal stage, female after mating lays 100 eggs in mass under its wax scale during April for 1st generation and late October for second generation, eggs occupied a period of 7 days. The nymphal period lasted 36 days during summer and 136 days during winter (Arambourg; 1984).

## **II. COLEOPTERA**

### **A. SCARABAEIDAE**

#### **1. *Tropinota squalida* Scop.**

(Flower chafers)

**Host plant:** Apple, grapevine, pear.

**Egg:** Spherical-shaped, early stage white turns to dark brown before hatching.

**Larva:** curved, cylindrical-shaped larva white in colour turns to deep brown before pupation.

**Pupa:** White in color, pupate inside mud cell in soil, resembles parent.

**Adult:** Bright black coloured, body covered with yellowish green 1mm length hairs, elytron wing distinguished with twelve white spots; body length 15mm.

**Biology:** In studied area there is one generation of the beetle per year and overwintering occurs in the adult stage, transfer at the beginning of spring in April to tree flowers, mated female lays eggs inside soil at depth of 5cm; eggs hatch during one week into larva which feed upon organic material in soil for 50 days and pass through three instars, then pupate inside mud cell in soil (Al-Abbadi, et al ;1998).

### **B. BUPRESTIDAE**

#### **2. *Capnodis tenebrionis* L.**

(Peach capnodis)

**Host plant:** Almond.

**Egg:** Very small oval-shaped, white coloured, it is 1mm length.

**Larva:** Apodous, white-coloured, brown head equipped with strong jaws, body 10-segmented first one enlarged enough and covers head, last larval instar is 65mm long.

**Pupa:** Obtect resembles adult in shape white in colour, 35mm long.

***Morphological and biological notes of insect pests attacking.....***

**Adult:** Black coloured beetle covered with white dust and it is 27mm long, thorax upper side distinguished with 4 black spots for each side, it is 37mm long.

**Biology:** Observations indicated one generation a year. Adults occur between early May and late September, female after mating lays 100 eggs in tree bark crevices near trunk basal part, eggs hatch within one week during March and April, larval period exceeds one year and pupal stage lasts 3-5 weeks.

**C. SCOLYTIDAE**

**3. *Phloeotribus scarabaeoides* Fab  
(Olive neiroun)**

**Host plant:** Olives.

**Egg:** Oval-shaped very small, white yellowish in colour.

**Larva:** Curved-shaped Apodous, body white to pale yellow in colour, scarabei form larvae with red head, grub 3mm long when full grown.

**Pupa:** Obtect, white, it is 3mm in length.

**Adult:** Oval-shaped beetle 2.5mm long, black or dark brown, body covered with small grey hairs; antennae lamellate type.

**Biology:** Observations indicated three generations a year it overwinters in adult, larval and pupal stage, mated female lays 100 eggs around mother chamber under bark, larval activity begun in February bores parallel galleries 2.5cm length under bark vertically to mother chamber, 5 instars larva fed with cambium take about 21-30 days then pupate under bark for 7-10 days (Armbourg; 1984).

**4. *Scolytus mediterraneus* (Ratz)  
(Stone fruit bark borer)**

**Host plant:** Almond; peach.

**Egg:** Small spherical-shaped, white coloured, 1.7mm long.

**Larva:** White apodous, last larval instar 3mm length.

**Pupa:** White, resembles parent, 2.3mm long.

**Adult:** Small cylindrical-shaped, black to dark brown it is 2.5mm long; with small black head and elytron has longitudinal punctures.

**Biology:** Observations indicated two generations of the beetle per year and overwintering occurs in the larval or pupal stage inside tunnels under bark. Adult emergences from holes begin in mid March, female after mating lays 150 eggs during one month, hatching larvae built secondary vertical tunnels to main mother tunnel. Fed and developed towards end of season to pupa and adult (Mustafa, 1986).

**S. Y. Al-Abbadi**

### **III. DIPTERA**

#### **A. TRYPETIDAE**

##### **1. *Dacus (Bactrocera) oleae* Gmel**

**( Olive Fruit fly)**

**Host plant: Olive.**

**Egg: elongate white coloured and it is 0.8mm long .**

**Larva: grub like, narrowing anteriorly, apodous white and it is 7.5mm long when full grown.**

**Pupa: Varil shaped, yellowish brown it is 4mm long.**

**Adult: Yellowish chestnut, wings membranous yellowish-coloured, with brown veins, wing-span 11mm, compound eyes bright green, brown abdomen distinguished with three black spots, thorax brown with three longitudinal dark bands and it is 5mm long (Abou Ghadir; 1966)**

**Biology: In studied area there was three generations of the fly per year, the first occurred during June-July; the second during August-September and the third during September -October, overwintering occurs in the pupal or adult stage, fly completed it's life cycle in 45 days. Females after mating lay around 200-250 eggs individually at 1mm depth inside fruit by ovipositor, the eggs hatch in about 2-19 days, hatching larvae boring inside fruit for three weeks (Mustafa *et al.*,1987), they pass through three feeding stadia, then pupate inside soil during autumn, the pupal stage last about 2 weeks (Guario and Notte, 1997).**

#### **B. LONCHAEIDAE**

##### **2. *Lonchaea aristellae* Beck**

**( Fig Fruit fly)**

**Host plant: Fig.**

**Egg: Oval-shaped, white; with dark colour in apical part, it is 0.9mm.**

**Larva: elongate; apodous maggot tapering to head, white and it is 0.9mm long.**

**Pupa: Obovate, covered with cocoon, brown in colour and it is 4mm long.**

**Adult: Black metallic blue midges, eyes red, legs brown, transparent wings with pale coloured veins, and it is 3.5mm long.**

**Biology: Observation indicated three generations a year, the winter is passed in the pupal or adult stage inside soil at 5mm depth, female after mating lays 2-4 eggs for each fruit by ovipositor; during May and June, the egg stage lasts one week, the larva penetrate fruit and fed for 10-20 days and pass through three instars, last larval instar fall down and pupate inside soil at 5cm depth, pupation period lasts 7-10 days, adult live for two weeks.**

#### **C. TEPHRITIDAE**

##### **3. *Ceratitis capitata* Wiedemann**

***Morphological and biological notes of insect pests attacking.....***

**(Mediterranean fruit fly)**

**Host plant:** peach; fig, grapevine.

**Egg:** Banana-shaped, creamy white coloured, narrowing towards apex 1mm long.

**Larva:** Elongate conical-shaped maggot yellowish white, last larval instar 8mm long.

**Pupa:** Varil in shape, pale to dark brown, it is 4.5mm long.

**Adult:** Yellow head, large compound eyes bright red to blue in colour, antennae brown; membranous wings covered with brownish bands and spots; Abdomen has two light coloured rings and the thorax is irregularly patterned with white or black and skull shaped on frontal part, male has appendages frontally between antennae, it is 5mm long.

**Biology:** The fly indicated three generations in a year in Al-Qasir area because of limited host plants, and overwintering occurs in the adult and pupal stage, one week old female after mating deposits eggs in masses 8-10 eggs each and total about 300 eggs in plant tissue by ovipositor to hatch after one week hatching larva fed on plant tissue for two weeks with three moulting instars then pupate inside soil at 5cm depth, last ten days and total life cycle about one months during summer and two months during winter, adult fed by nectar & honey dew (Shoukey and Hafez, 1979).

**D. DROSOPHILIDAE**

***4. Drosophila melanogaster Meg.***

**(Fruit fly)**

**Host plant:** Decaying fruit, grapevine, Apricot.

**Egg:** Oval with two appendages, bright white in colour it is 0.5mm long.

**Larva:** Transparent, colour changes according food material it is 5mm long.

**Pupa:** Yellow turns to brown and it is 3mm long.

**Adult:** Eyes red in colour, yellowish-coloured small fly, 2.5mm long with black line on abdomen.

**Biology:** Observations indicated more than 20 generations a year, it has a short life cycle (8-10 days); mated female deposited 200 eggs on decaying fruit or vegetable, eggs hatch in 24 hours, hatching larva three instars fed by fruit flesh for four days, pupation period takes 5 days.

**IV. LEPIDOPTERA**

**A. COSSIDAE**

**1. *Zeuzera pyrina L***

**(Leopard moth)**

**Host plant:** Apple.

**S. Y. Al-Abbadi**

**Egg:** Oval elongate-shaped, reddish yellow to red brown in colour, it is 1mm long.

**Larva:** Cylindrical, background colour whitish to dark; yellow with black tubercles on the dorsum, head, prothorax and last abdominal tergite brown, it is 60 mm when full grown and 8mm in width

**Pupa:** Cylindrical brown to yellow colour, 35mm long and 8mm in width.

**Adult:** Butterfly average length 27mm and 65 mm wing-span fore wings white with numerous rounded metallic blue spots which developed on apple, female antennae filiform, male bi-pectinate, thorax has 6 blue spots, three for each side (El-Defrawi, et al: 1967).

**Biology:** The observation in studied area showed one generation of the butterfly per year, one week old nocturnal female after mating deposits around 200 eggs inside stem and branches crevices during August, September and October eggs hatch in 10 days, hatching larva bore inside wood upward in trunk and branches, larva have 7 instars lasts 7 months, pupal period one month during May and June (Bodenheimer and Klein, 1927).

**B. TORTRICIDAE**

**2. *Lobesia botrana* schiff**

(Grape-berry moth)

Host plant: Grapevine.

**Egg:** round-shaped, yellow when laid turns to bright, transparent before hatching and it is 0.7mm long.

**Larva:** Grey to greenish covered with hairs 11mm long when full grown.

**Pupa:** Greenish brown, abdomen end has 8 hooks, larva found inside white silken cocoon it is 9mm long and 3mm width.

**Adult:** Fore wings grey to greenish or yellowish coloured each wing with grey and brown spots and olive green marginal setae, hind wings setae grey, head and thorax greenish brown; it is 6mm long and 12mm wing-span.

**Biology:** Observations showed 4 generation a year, the adult moth emerges during April and May from pupal cocoons which have over wintered in between grape vine crevices and around grasses (Briere and pracros: 1997), mated female deposits around (50-100) eggs individually, rarely in small group on new buds, egg period (8-10 days) larval duration lasted (17-18 days), pupal stage about one week (Ephtedar, 1996), in studied area 1st generation extended from mid-January to late April, 2nd generation from early May to late June, 3rd generation from early July to late August and the fourth generation occurred between late August and late October (Al-Abbadi and Al-Zyoud, 1999).

**3. *Cydia pomonella*. L**

(Codling moth)



## ***Morphological and biological notes of insect pests attacking.....***

**Host plant:** Apple.

**Egg:** Flat oval-shaped, white to pale yellow, 1mm long .

**Larva:** Body is white pink to reddish, brown head; pronotum and last abdominal segment are brown, each segment bears small tubercles tufted with setae; fully grown larva are 20mm long.

**Pupa:** Light brown inverted in a cocoon of white mesh length is 17mm.

**Adult:** Grey-coloured in general, body length 12mm, wing-span 17mm, forewings are bluish grey marked with fine brown zigzag lines with large dark brown spot containing two transverse bands of gold colour at apical angle of each fore wing, hind wings have reddish grey hairs, nocturnal species.

**Biology:** It exhibited three generations per year in this study, first generation occurred during April and May second during June-July and third generation during August-September (El-Mosa;1981), one week old female after mating deposited eggs singly on the leaves or fruits during early March, early June, early August egg stage lasted one week, larval period 20 days, pupal period 14 days, overwintering occurs as late stage larva in silken cocoon under loose bark (Madanat, 1997).

### **C. LAYCAENIDAE**

#### **4. *Deudorix (Virachola)* Klug**

(Pomegranate butterfly)

**Host plant:** Pomegranate.

**Egg:** Spherical, bright white to green; 0.6mm in diameter with ridges.

**Larva:** Green up on hatching changes to red when full grown, black head and body covered with dark hair it is about 13mm in length.

**Pupa:** Oblong, red to brown, 10mm long.

**Adult:** Both male and female wings lower side grey, male wings upper side bright a range with brown colour anteriorly and large brown spots on lower part of hind wing, female wings upper side, bright violet to red with two spots on hindwing anteriorly and posteriorly . it is 10mm long and 25mm wing-span.

**Biology:** Survey indicated three generations a year, adult appeared during March and April mating female laid eggs on flowers, fruits, stems and leaves either singly or in group of 2-7 and total about 31 eggs incubation period 4-7 days, hatching larva bore inside fruit and fed by seeds, three instars larval period reached 24 days, than pupate inside larva tunnel or on branches for 9-14 days and main generation time is 45 days.(Karuppuchamy *et al.*, 1998).

### **D. SPHINGIDAE**

#### **5. *Hippotion celerio*. L**

(Grape sphinx)

(Grape hawkmoth)

**S. Y. Al-Abadi**

**Host plant:** Grapevine.

**Egg:** Rounded flat, first green turns to yellow, 2mm in diameter.

**Larva:** Range between green, brown, black, thoracic segment tapered anteriorly and the first two segments have whitish black spots with re-curved spine above the end of the body. it is 80mm when full-grown

**Pupa:** Brown, with clear proboscis, it is 60 mm long.

**Adult:** Sturdy grey with silver stripes on the fore wing and wing-span of about 55-60 mm, hind wings have pale margins with silvery strip along the back, it is 40mm long.

**Biology:** The observations indicated two generations a year, the moth appears from early April, mated females deposited 50 eggs individually on upper surface of leaves hatching in one week, hatching larva fed by leaves tissue during May and June, pupae take place in the debris around base of the vine inside silken cocoon, 2nd generation started in early July until end of September.

## **VI. HYMENOPTERA**

### **A.VESPIDAE**

#### **1. *Vespa Orientalis* L.**

**(Red wasp)**

**Host plant:** Fig, grapevine (Marcovitch, 1952)and predator on honey bees.

**Egg:** Oval-shaped white to brown colour measurement is (2.8mmX1.2mm).

**Larva:** Spindle-shaped, apodous white, 25mm long.

**Pupa:** Exarate, white with grey eyes resemble adult in size and shape.

**Adult:** Queen 35mm long, male 27mm long, worker 25mm, red and brown in general with yellow strips and spots distributed over 3rd and 4th abdominal segments, labral middle part and antennal basal part.

**Biology:** Fertilized queen occurs during autumn(fall) with slow down flight searching for suitable place to spend winter. In early March and April the overwintering queen looking for suitable place to built it's nest inside different crevices., construct hexagonal cells to lay eggs hatched during 5 days to larva which served by Queen at first then by older workers; larva has 5 instars lasts two weeks, spinning silken cocoon for four days then transformed to pupa takes about 9 days, life cycle lasted about 29 days for worker, 42 days for queen and 39 days for male adult live 1-3 month.

## **REFERENCES**

- Abou Ghadir, M. 1966. Studies on the olive fruitfly *Dacus oleae*. (Diptera:Tripetidae). M.sc Thesis. Fac.of Agric. Univ. of Alex.Egypt.

***Morphological and biological notes of insect pests attacking.....***

- Al-Abbadi, S. Y. and F. Al-Zyoud, 1998. Survey of appl arthropod pests in Al-Shawbak area-Jordan(accepted). The scientific journal of Al-Qadisiya University Vol.6, No.1, 2001.PP.106-116.IRAQ
- Al-Abbadi, S. Y. and F. Al-Zyoud. 1999. population trends of grape berry moth; *lobesia botrana* schiff. (lepidoptera: Tortricidae) and it is parasitoids in Rakin Area, Karak, Jordan. Mu'tah Lil-Buhuth wad-Dirasat (Natural and applied sciences series Vol(15) No(3) 2000.published by Mu'tah University.
- Al-Qasir department of Agriculture. 1998. Annual report Karak-Jordan.
- Arambourg, Y. 1984. Homoptera-coccidae *Saissetia oleaea* olivier. *Olivae* June 32-34.
- Arambourg, Y. 1984. (Coleopteran:Scolytidae),*Phloeotribus Scarabaeoidae*, *Olivae*. 27-28.
- Bene, G. Del., E. Gargani. S. Landi.1997.Observations on the life cycle and diapause of *Euphyllura olivina* (costa) and *Euphyllura phillyreae* Foerster (Homoptera: Aphalaridae).Advances in Horticultural science. 11 (1) 10 istituto sperimentale per la zoologia Agraria. Miraaf 50125 Firenze.Italy.
- Bodenheimer, F. S. and H. Z. Klein. 1927. Studies on the life history and the control of *Zeuzera pyrina* L in palestine Agric.Records.Tel-Aviv 1,63-88.
- Borror, D. J, Triplehorn, A. Charles and N. F. Johnson, F. Norman. 1989. An introduction to the study of insects. Sixth Edition, Philadelphia;Saunders college publishing pp. 790.
- Briere, J. F. and P. Pracros. 1997. Modelling of the population dynamics of the grape berry moth (*lobesia botrana* Den and schiff). Association Nationale pour la protection des plantes (ANPP) 373-380 unite de recherches de zoologie. France.
- El-Defrawi, M. I., Hanbal and S. Hammad. 1967. Biology and control of leopard moth on pear trees in the united Arap Republic F.A.O. plant. Prot. Bull. 15 (4).
- El-Mosa, H. 1981. Studies on the seasonal cycle and control of codling moth on Apples in Jubaiha Diraasat vol.8(1):7-13(Arabic).
- Ephtedar, E. 1996. Biology of *Lobesia botrana* in fars provience. Applied entomology and phytopathology 63 (1/2) 5-6 (En.14ref) Fars agricultural research centre, zarghan, Iran.
- Guario, A. and F. LA. Notte. 1997. The olivefly in the mediterranean region, Actual knowledge and control strategies. *Phytoma* 4,(493)45-48 Regione puglia, Assesseorato agricultura e forest, osservatorio perle malattie delle piante, palazzo agricultura v. luciano melez, 70100 Bari.Italy
- Karuppuchamy, P., G. Balasubramanian and P. C. S. Babu. 1998. Seasonal incidence and management of Aphid, *Aphis punicae* on pomegranate. Madras agricultural Journal. 85(5/6) 224-226.Horticultural research station, Tamil-Nadu. Agricultural university Yercaud 636602.India.

**S. Y. Al-Abbadi**

- Karuppuchamy, P., G. Balasubram, P. C. Sundara Babu. 1998. The biology of pomegranate fruit borer, *Deudorix isocrates*. Madras Agricultural Journal. 85 (5/6) 252 -256. Horticultural research station, Tamil Nadu Agricultural university Yercaud 636602. India.**
- Madanat, H. M. 1997. Population trends of certain Arthropod pests on apple and chemical control of codling moth *cydia pomonella* .L.(Lepidoptera: Tortricidae) in Ash-shawbak-Jordan. Master thesis University of Jordan; Amman-Jordan.**
- Marcovitch, S. 1952. Observation on insect pest in Israel. FAO plant prot. Bull.1.No 2:25-26 (R.A.E.41-216).**
- Mustafa, T. M. and Y. H. Najjar. 1985: Contributions to the reproductive biology of *olive psylla*; Z.ang.Ent.,100,-79-83.**
- Mustafa, T. M. 1986. Host response and life history of fruit trees bark borer *scolytus mediterraneus* in Jordan. Giornale Ital. Di Entomologia 5, 199-202**
- Mustafa, T. M., K. Al-Zaghal and M. Humaid. 1987. influence of *Dacus oleae* infestation on the olive fruit contents in Jordan, Actes inct. Agron.Vet., 7.51-57.**
- Sharaf, N., 1987. Plant protection against insect pests in Jordan: background and prospects. Publication of the University of Jordan/Amman.**
- Shoukey, A. and M. Hafez. 1979. Studies on the biology of the Mediterranean fruitfly. *Ceratitis capitata* weid entomol. Exp. Appl, 26(1)33-39.**
- Talhouk, A. S. 1969. Insects and mites injurious to crops in Middle Eastern countries, verlag paul parey-Hamburg and Berlin.**

ملحوظات مورفولوجية وبيولوجية للحشرات التي تهاجم  
الأشجار المثمرة في منطقة القصر - الكرك - الأردن

سعود يوسف العبادي

كلية الزراعة - جامعة مؤتة - الكرك - الأردن

الملخص العربي

تغطي الدراسة جميع المناطق المزروعة بأشجار الفاكهة في منطقة القصر بمحافظة الكرك في الأردن. وتبلغ مساحة الأراضي المزروعة حوالي (١٢٦٩,٤) هكتار وهي تمثل حوالي ٣% من إجمالي مساحة المنطقة.

لقد تم إجراء الدراسة للفترة ما بين ١٩٩٦ و ١٩٩٨ حيث تم تحديد ثمانية عشر نوعاً من الحشرات تابعة لخمسة رتب حشرية وخمسة عشر عائلة قد تم جمعها ودراسة أطوارها الحياتية في المنطقة. وقد وجد أن أربعة من هذه الأنواع تهاجم أشجار الزيتون واثنان تهاجم أشجار الغنبد واثنان تهاجم أشجار التين واثنان أشجار التفاح واثنان تهاجم أشجار الرمان وواحدة على اللوز وخمسة تهاجم أكثر من نوع من أشجار الفاكهة. وقد تم تسجيل الظروف البيئية القائمة في منطقة الدراسة لتحديد الأطوار الحياتية للحشرات وأجياله السنوية.