

SURVEY AND TAXONOMY OF THE MAIN PESTS AND THEIR NATURAL ENEMIES ATTACKING CITRUS AND OLIVE TREES IN EGYPT AND MOROCCO IN COSTAL AREAS WITH SPECIAL KEYS TO THE PESTS AND THEIR NATURAL ENEMIES

Abd-Rabou, S. ¹ and M. Abbassi ²

¹ Plant Protection Research Institute, Agricultural Research Center, Dokki, Giza, Egypt.

²Laboratory of General Ecology and Applied Entomology, Faculty of Sciences, University of Moulay Ismail, Meknès, Morocco.

ABSTRACT

The present work deals with the survey of main pests attacking citrus and olive in Egypt and Morocco. The results indicated that fourteen and seven species are the principal key pests attacking citrus and olive trees, respectively. Citrus pests associated with 18 parasitoids and 11 predators while olive pests associated with 11 parasitoids and 5 predators. The most important families of natural enemies were Aphelinidae, Encyrtidae, Eulophidae, Pteromalidae, Trichogrammatidae (parasitoids) and Anthocoridae, Coccinellidae, Chrysopidae, Tetranychidae (Predators). Keys for the pests and their natural enemies were provided.

INTRODUCTION

The most important crops occurrence in Egypt and Morocco were citrus and olive. These pests caused a serious damage for the citrus and olive in Morocco and Egypt, respectively. Many of them can cause appreciable losses in quality and quantity of citrus and olive trees. Pests attacking citrus and olive were studied by Abbassi (1980), El-Hakim and El-Sayed (1985), Abdel-Rahman (1995), Abbassi (1996, 1999a,b), Abd-Rabou (2001a, b, 2004a, b) and Abbassi (2006,2007,2008).

The aim of this work is to study the survey of pests and their natural enemies attacking citrus and olive trees in Egypt and Morocco.

MATERIALS AND METHODS

Sampling was carried out all over the year in different locations in Egypt and Morocco from 2007-2008. Infested plant parts were placed in plastic bags and adult emergence was monitored. The materials were mounted and identified by the authors. The emerging adult parasitoids were transferred into vials of 70% ethanol. Identification of parasitoids made by slide mounted adults in Hoyer's medium according to (Noyes, 1982).

The procedures of slide mounts as follows: Dried specimens are soaked in glacial acetic acid (7 drops) mixed with chloral phenol (5 drops) in small watch glasses.

- a. After 48 hours specimens should be satisfactorily cleared.
- b. The cleared specimens are then mounted in Hoyer's medium.

After drying for about two weeks under 40 °C, the slide cover is ringed with a suitable sealer. Predators also were collected and identified. Identification of the parasitoids followed by the keys of Rosen and DeBach (1979), Temerak

(1981), Hamon and Williams (1984), Noyes and Hayat (1994), Prinsloo (1996) and Hayat (1998).

RESULTS AND DISCUSSION

The result of this research indicated that there are diverse fauna of citrus and olive in Egypt and Morocco. In a total of 20 pest species attacking citrus and olive in Egypt and Morocco, Aleyrodidae (3 species), Aphididae (3), Aphalaridae (1), Coccidae (1), Diaspididae (5), Gracillariidae (1), Melniopidae (1), Pseudococcidae (1), Tephritidae (1), Tetranychidae (1) and Yponomeutidae (1). These species recorded here associated with 38 natural enemy species, Anthracoridae (1), Aphelinidae (10 species), Aphidiidae (1), Chrysopidae (1), Coccinellidae (10), Encyrtidae (7), Eulophidae (3), Pteromalidae (1), Phytoseidae (1), Trichogrammatidae (3).

1. List of pests and their natural enemies of citrus in Morocco:

Fourteen species of pests [Aleyrodids (1), Aphidids (3), Coccids (1), Diaspidids (4), Gracillariids (1), Melniopids (1), Pseudococcids (1), Tetranychids (2)] attacking citrus trees in coastal areas in Morocco which are attacked by 22 natural enemy species, Aphelinids (5), Aphidiids (1), Encyrtids (5), Eulophids (5), Coccinellids (6).

1. Pest : *Aonidiefla aurantii* Maskell (Homoptera : Diaspididae)

Natural enemies :

Parasitoids : *Aphytis melinus* DeBach, *Encarsia* sp. (Hymenoptera: Aphelinidae) and *Comperiella bifasciata* Howard (Hymenoptera : Encyrtidae)

Predators : *Rhyzobius lophanthae* (Blaisdell), *Chilocorus bipustulatus* (L.) (Coleoptera.: Coccinellidae).

2. Pest : *Planococcus citri* (Risso) (Homoptera : Pseudococcidae)

Natural enemies :

Parasitoids : *Leptomastix dactylopii* Howard and *Coccidoxenoides peregrinus* (Timberlake) (Hymenoptera : Encyrtidae)

Predators : *Cryptolaemus montrouzieri* Mulsant (Coleoptera.: Coccinellidae)

3. Pest : *Phyllocnistis citrella* Stainton (Lepidoptera: Gracillariidae)

Natural enemies :

Parasitoids : *Ageniaspis citricola* Logvinovskaya (Hymenoptera: Encyrtidae), *Cirrospilus ingenuus* Gahan, *Semiela cher petiolatus* (Girault), *Citrostichus phyllocnistoides* (Narayanan), *Cirrospilus pictus* Nees and *Pnigallo* sp. (Hymenoptera: Eulophidae),

Predators : *C. bipustulatus*

4. Pest : *Icerya purchasi* Maskell (Homoptera : Margaroidae)

Natural enemies :

Predators : *Rodolia cardinalis* (Mulsant) (Coleoptera: Coccinellidae).

5. Pest : *Cornuspis beckii* (Newman) (Homoptera : Diaspididae).

Natural enemies :

Parasitoids : *Aphytis lepidosaphes* Compere (Hymenoptera : Aphelinidae)

Predators : *C. bipustulatus*

6. Pest : *Parlatoria pergandii* Comstock (Homoptera : Diaspididae).

Natural enemies :

Parasitoids : *Aphytis hispanicus* Mercet

Predators : *C. bipistulatus*

7. Pest : *Paralatoria ziziphi* (Lucas) (Homoptera : Diaspididae).

Natural enemies :

Parasitoids : *Aphytis* sp. and *Encarsia* sp. (Hymenoptera : Aphelinidae) ;

8. Pest : *Panonychus citri* (Mc Gregor) (Acari: Tetranychidae)

Natural enemies :

Predators : *Euseius* sp. (Acari : Phytoseidae) and *Stethorus* sp. (Coleoptera: Coccinellidae).

9. Pest : *Tetranychus urticae* (Koch) (Acari: Tetranychidae)

Natural enemies :

Predators : *Euseius* sp. And *Stethorus* sp.

10. Pest : *Toxoptera aurantii* (Boyer de Fonscolombe) (Homoptera: Aphididae)

Natural enemies :

Parasitoids : *Aphidius* sp. (Hymenoptera: Aphididae)

Predators : *Coccinella transversalis* Fabricius (Coleoptera: Coccinellidae).

11. Pest : *Myzus persicae* (Sulzer) (Homoptera: Aphididae)

Natural enemies :

Parasitoids : *Aphidius* sp.

Predators : *C. transversalis*.

12. Pest : *Aphis spiraeicola* Patch (Homoptera: Aphididae)

Natural enemies :

Parasitoids : *Aphidius* sp.

Predators : *C. transversalis*

13. Pest : *Coccus hesperidum* Linnaeus (Homoptera: Coccidae)

Natural enemies :

Parasitoids : *Metaphycus* sp. (Hymenoptera: Encyrtidae)

14. Pest : *Aleurothrixus floccosus* Maskell (Homoptera: Aleyrodidae)

Natural enemies :

Parasitoids : *Cales noacki* Howard (Hymenoptera : Aphelinidae)

Key of pests attacking citrus in Morocco

1. It comprises two regions, cephalothorax and abdomen and four legs.....2
- It comprises three regions, head, thorax and abdomen and three legs.....3
2. Two pairs of para-anal setae, tibia I with 1 smooth solenidion, Hysterosoma with clunal setae (h1) similar in length to outer sacral setae (f2); f2 near onethird as long as inner sacral (f1)..... *Panonychus citri*
- One pair of para-anal setae, summer form green; striae between third (e1) and fourth dorsomedian setae (f1) often with semi-oblong or rounded lobes, which are wider than tall; tibia I with only 10 setae; male: aedeagus with acute anterior angulation, dorsum of knob of aedeagus rounded..... *Tetranychus urticae*
3. Wings covered with scales, adults are small, with a wingspan of 0.16 in (4 mm) and a length of 0.08 in (2 mm) at rest. The forewing is white with silvery reflections, black and tan markings, and a small apical black spot. Full-grown larvae (0.12 in, or 3 mm) are flattened and translucent green with atrophied prolegs and legs..... *Phyllocnistis citrella*
- Wings not covered with scales, though they may be hairy, mouth-parts tube-like, adapted for piercing and sucking.....4
4. Tarsi 1 segmented with a single claw.....5

- Tarsi 2 segmented with two claws.....11
- 5. Abdominal spiracles present, anal ring simple with no pores or -setae, antennae 1-3 segmented..... *Icerya purchasi*
- Abdominal spiracle absent6
- 6. With an anal plate or plates covering or lying over the anal opening, dorsum with a pair of triangular or subtriangular plates which form an operculum covering the anal opening and situated at anterior end of a well-developed anal cleft, dorsal setae cylindrical with pointed apex
.....*Coccus hesperidum*
- Without an anal plate or plates lying over the anal opening.....7
- 7. Posterior segments of abdomen fused into pygidium or a pygidium-like area, body usually covered with a shield-like scale which is easily separable from body, anal ring simple without setae8
- Posterior segments of abdomen not fused into pygidium , body not covered with a shield-like , anal ring simple without setae, multilocular disc pores scarce behind anterior coxae and posterior spiracles, these pores on the posterior portion of abdominal segments usually arranged in a continuous double row, with more ventral tubular ducts on head 12 (6-19) and on prothorax 24 (16-32) *Planococcus citri*
- 8. Pygidium of adult female without plates, with gland spines only, groups of privalvar pores present, with submarginal round bosses on the first two and fourth abdominal segments, one boss on each side of a segment
..... *Lepidosaphes beckii*
- Pygidium of adult female usually with plates, with or without gland spines only.....9
- 9. Macroducts of the one-barred type, disposed mostly in the glandiferous marginal or submarginal furrows or crypts of the different pygidial areas, cephalothotactic cuticle thickened, thoracic laterally turned down and encircling the pygidium, external plates are present on segment VI.....
..... *Aonidiella aurantii*
- Macroducts of the two-barred type, disposed on isolated elements or in regular order on the different pygidial areas.....10
- 10. Eye spot greatly enlarged, appearing as ear-like lobes, shield black.....*Paralatoria ziziphi*
- Eye spot either spur like or lacking , shield never black, Lobe 3 and lobe 4 separated by four lateral plates..... *Parlatoria pergandii*
- 11. Antennae with 3-7 segments, presence of the submarginal fold at the caudal area, it is probably an extended pair of longitudinal folds, which is usually present in combination with a rhachis, dorsal surface covered with cotton-like secretions *Aleurothrixus floccosus*
- Antennae usually 6 segmented.....12
- 12. Frontal tubercles very developed. Siphunculi more or less swollen. Body brown or green Frontal tubercles converging, inward on mesal side, spinulosa. Third antennal segment of aptera without rhinaria. Siphunculi is much longer than cauda, cylindrical or swollen at apical third. Cauda some what constricted at or near middle and acuminate at apex , with three lateral hairs. Abdomen with a large more or less soild black patch. Body green, light pink or pale..... *Myzus persicae*
- Frontal tubercles present bur not very developed. Siphunculi cylindrical, never swollen.....13
- 13. With a stridulating mechanism, body brown or black, third antennal segment of alate pale except at the very apex and having 2-8 rhinariae, arranged in a single row and extending to the whole length, fourth segment without rhinaria. Media of forewing once branched
..... *Toxoptera aurantii*

Without a stridulating mechanism, body greenish yellow or grey, fourth antennal segment of alate somewhat with 0-4 rhinariae, cauda with more than 3 lateral hairs, body usually living within curl leaves..... *Aphis spiraeicola*

Key of parasitoids associated with pests attacking citrus in Morocco

1. Antennae not elbowed, head transverse, as wide as wider than thorax at tegulae, occiput marginal. Antennae with variable number of segments (13 to 23)..... *Aphidius* sp.
- Antennae usually elbowed, number of antennal segments, fore wing with five or fewer cells..... 2
2. Mesopleuron large and without a femoral groove..... 3
- Mesopleuron impressed and with a femoral groove..... 7
3. Forewing shortened, not extended to apex of metasoma, funicle cylindrical, mesosoma and metasoma dorsally matt, without metallic reflections, flagellum with at least some segments white... *Metaphycus* sp.
- Forewing not shortened, or if slightly reduced extending to apex of metasoma..... 4
4. Scape not more than 3 times as long as broad, forewing with two longitudinal infuscate rays, clava with apex transverse truncate, Mesoscutum, except sides of disc, dark metallic green with a median longitudinal cuperous band extending over entire length of disk, lateral ocelli separated from each other by about twice their own diameter, median longitudinal dark area on frontovertex wider than each of the two lateral white band, tibial spur of middle leg distinctly longer than basitarsus *Comperiella bifasciata*
- Scape more than 3 times as long as broad 5
5. Clava 1-segmented, scutellum and mesoscutum with deep longitudinal striate sculpture, funicle with first 2 segments shorter than third ...
..... *Ageniaspis citricola*
- Charactera different..... 6
6. Funicle with all segments longer than broad, scutellum and mesoscutum shiny, with similar shallow reticulate sculpture... *Leptomastix dactylopii*
- Funicle not with all segments longer than broad, scutellum and mesoscutum not strongly convex, frequently metallic but in matt then sculpture not finely striate, submarginal vein with strong subapical expansion
Coccidoxenoides peregrinus
7. Tarsi four-segmented..... 8
- Tarsi five-segmented..... 12
8. Funicle that is 3-4 segmented..... 9
- Funicle that is 2-segmented..... 10
9. Adult black, one translucent patch on the abdomen, compound eyes and ocelli red, antenna yellow, funicle elongate 3-segments, club elongate 3-segments with setae. All legs yellow, tarsi 4-segments. Male smaller than female..... *Citrostichus phyllocnistoides*
- Adult mainly metallic-green or green with white to brown coloured markings on scape, and legs. Female funicle 4- and club 2-segmented (rarely funicle and club both 3-segmented)..... *Prigalis* sp.
10. Adults are 1 to 2 mm long, the female is brown with a yellow abdomen and the male's abdomen is brown at the tip Funicle with 2-3 segments, ..
..... *Semiela cher petiolatus*
- Funicle that is 2-segmented 11
11. Propodeum smooth, lightly sculptured and sculpturing on scutellum incised. Host range wide and variable *Cirrospilus pictus*
- Propodeum distinct, strong sculptured, gaster with 3 to 5 complete transverse dark strips..... *Cirrospilus ingenuus*
12. Antennae 7-9 segmented, fore wing without linea calva *Encarsia* sp.
- Antennae 4-6 segmented, fore wing generally with linea calva 13
13. Propodeal crenulae large and overlapping, club 3.4 to fully 4 times as long as wide, fully..... *Aphytis melinus*
- Propodeal crenulae (large or small) non-overlapping..... 14

14. Mesoscutum 13 setae, 4 times as long as metanotum *Aphytis hispanicus*
- Mesoscutum 12 setae, 4.5 times as long as metanotum *Aphytis lepidosaphes*

Key of predators associated with pests attacking citrus in Morocco

1. Four pairs of legs, dorsal shield smooth, with setae and movable digit with teeth, predators of mites *Euseius* spp.
- Three pairs of legs, tarsi appearing 3-3-3, but actually 4-4-4, head often concealed by pronotum, antennae short with a 3- to 6-segmented club...2
2. Ladybirds are medium to large size ladybirds (3-12mm) that with smooth3
- Ladybirds are small to medium in size (2-8mm)4
3. Larva length 5mm, adult length 3mm This ladybird is also known as mealybug destroyer *Cryptolaemus montrouzieri*
- Larva length 7mm, adult length 5-6mm Transverse ladybirds are common in Brisbane. They active during the day and both adults and larvae are predators of soft-bodied insects such as aphids. Both adults and larvae can be found on the same plants. *Coccinella transversalis*
4. Their body is covered with short hairs *Rhyzobius lophanthae*
- Their body is covered with different5
5. Their body is in round helmet shape, The ladybird was bright orange in colour with dark edges on the wing-cover base.. *Chilocorus bipustulatus*
- Their body small or very small6
6. Adults are very small, densely pubescent, red and black lady beetles, about 2.5-4 mm (1/16-3/16 inch) long *Rodolia cardinalis*
- Adults are tiny, 1.5mm long, dark brown to black, oval beetles with brownish yellow antennae, mouthparts and legs *Stethorus* sp.

II. List of pests and their natural enemies of olive in costal areas in Egypt:

Seven species of pests [Aleyrodids (2), Aphalarids (1), Coccids (1), Diaspidids (1), Yponomeutids (1), Tephritids (1)] attacking olive trees in costal areas in Egypt which are attacked by 17 natural enemy species [Anthocorids (1), Aphelinids (5), Chrysopids (1), Coccinellids (4), Encyrtids (3), Pteromalids (1), and Trichogrammatids (2)].

1. **Pest** : The olive whitefly, *Aleurolobus olivinus* (Silvestri) (Homoptera: Aleyrodidae)

Natural enemies :

Parasitoids : None

Predators : None

2. **Pest** : The pomegranate whitefly, *Siphoninus phillyreae* (Haliday) (Homoptera: Aleyrodidae)

Natural enemies :

Parasitoids : *Encarsia inaron* (Walker) (Hymenoptera : Aphelinidae)

Predators : None

3. **Pest** : The olive fruit fly (*Bactrocera oleae* (Gmelin) (Diptera: Tephritidae)

Natural enemies :

Parasitoids : None

Predators : None

4. **Pest** : *Euphyllura straminea* Log. (Homoptera: Aphalaridae)

Natural enemies :

Parasitoids : None

Predators : None

5. Pest : *Parlatoria oleae* Colvée (Homoptera : Diaspididae).

Natural enemies :

Parasitoids : *Aphytis paramaculicornis* DeBach and Rosen, *A. chrysomphali* Mercet and *Encarsia aurantii* (Howard) (Hymenoptera : Aphelinidae)

Predators : None

6. Pest : *Prays oleae* (Bem) (Lepidoptera: Yponomeutidae)

Natural enemies :

Parasitoids : *Trichogramma cordubensis* Vargas and Cabello and *Trichogramma cacoeciae* Marchal (Hymenoptera : Trichogrammatidae)

Predators : *Chrysoperla carnea* (Stephens) (Neuroptera: Chrysopidae)

7. Pest : *Coccus hesperidum* L. (Homoptera: Coccidae)

Natural enemies :

Parasitoids :

Diversinervus elegans Silvestri, *Metaphycus flavus* (Howard) (Hymenoptera: Encyrtidae) and *Marietta leopardina* Motschulsky (Hymenoptera : Aphelinidae)

Predators :

C. bipustulatus, *Scymnus syriacus* Marseul and *Exochomus flavipes* (Thunberg) (Coleoptera: Coccinellidae) .

8. Pest : The Medditearian black scale , *Saissetia oleae* (Olivier) (Homoptera: Coccidae)

Natural enemies :

Parasitoids :

Baeoanusia sp. , *Diversinervus elegans* Silvestri, *Metaphycus flavus* (Howard), *M. zebratus* Mercet *M. helvolus*, *Microterys flavus*, *Parechthrodrinus coccidiphagus* (Hymenoptera: Encyrtidae), *Scutellista caerulea* (Fonscolombe) ((Hymenoptera : Pteromalidae) and *Marietta leopardina* Motschulsky (Hymenoptera : Aphelinidae)

Predators :

C. bipustulatus, *C. carnea*, *Coccinella undecimpunctata* Linnaeus, *Scymnus syriacus* Marseul and *Exochomus flavipes* (Thunberg) (Coleoptera: Coccinellidae) and *Orius* sp. (Hemiptera: Anthocoridae).

Key of pests attacking olive in Egypt

1. Insects with only two wings (one pair), scutum (dorsal area of thorax) without lateral yellow vittae*Bactrocera oleae*
- Insects with four wings (two pairs).....2
2. Wings not covered with scales, though they may be hairy.....3
- Wings covered with scales, Fore wings grey with silvery tone and small scattered dark spots. Hind wings are of uniform grey with frayed margins. Grey scales with a silvery tones cover the body and legs..... *Prays oleae*
3. Tarsi 1 segmented with a single claw.....4
- Tarsi 2 segmented with two claws.....6
4. With an anal plate or plates covering or lying over the anal opening, Dorsum with a pair of triangular or subtriangular plates which form an operculum covering the anal opening and situated at anterior end of a well-developed anal cleft, dorsal setae cylindrical with pointed apex5

Without an anal plate or plates lying over the anal opening. Posterior segments of abdomen fused into pygidium or a pygidium-like area, body usually covered with a shield-like scale which is easily separable from body, anal ring simple without setae -Pygidium of adult female without plates, with gland spines only, groups of privulvar pores present, with submarginal round bosses on the first two and fourth abdominal segments, one boss on each side of a segment

- 5. Dorsal tubular ducts present in a very small number on the marginal area only, ventral tubular ducts few, on thorax only..... *Parlatoria oleae*
- Dorsal tubular ducts absent, ventral tubular ducts present and numerous, dorsal setae conical, vulvar setae 4 or 5 on each side..... *Coccus hesperidum*
- 6. Antennae more than 8 segmented, adults are pale green to tan in color mixed with light brown and tiny, black spots..... *Saissetia oleae*
- Antennae with 3-7 segments *Euphyllura straminea*
- 7. Dorsal disc covered with siphon-like glands, body pale, the dorsal surface has 40 to 50 long glassy tubercles..... *Siphoninus phillyreae*
- Dorsal disc covered without siphon-like glands, body black, resembles a flat pellet stuck to the leaf. *Aleurolobus olivinus*

Key of Parasitoids associated with pests attacking olive in Egypt

- 1. Tarsi 3- segmented.....2
- Tarsi 4 or 5 segmented3
- 2. Male antennal setae are longer..... *Trichogramma cordubensis*
- Male antennal setae are shorter..... *Trichogramma cacoeciae*
- 3. Mesophleuron large and without a femoral groove.....9
- Mesophleuron impressed, and with a femoral groove.....4
- 4. Gaster distinctly constricted at its Junction with propodeum; female antenna with 9; scutellum very long, at least twice as long as mesoscutum; extending well over the gaster..... *Scutellista caerulea*
- Gaster subsessile, broadly attached with the propodeum.....5
- 5. Antennae 7-9 segmented, fore wing without lineae calva 6
- Antennae 4-6 segmented, fore wing generally with lineae calva7
- 6. Wings infuscated below the marginal and /or stigmal veins, fore wing narrow, third valvula 0.56 times as long as valvifer..... *Encarsia aurantii*
- Wings hyaline, pedicel shorter than F1. F1 subequal in length to F2, F3 and F4 individually..... *Encarsia inaron*
- 7. Propodeum short, without crenulea, antennal scape with the band short, extending caudad from about middle of ventral margin..... *Marietta leopardina*
- Propodeum long, bearing marginal crenulea8
- 8. Occiput with a fuscous to black bar on each side of foramen , the mouth margin and/or malar sulcus sometimes fuscous, clava usually about 3x as long as broad. Biparental species..... *Aphytis paramaculicomis*
- Occiput without such bars on sides of foramen; mouth margin and malar sulcus usually not fuscous, clava more than 3x as long as broad. (Uniparental species)..... *Aphytis chrysomphali*
- 9. Fore wing normal at least very nearly reaching apex of gaster.....11
- Fore wing shortened, clearly reaching apex of gaster.....10
- 10. Scutellum without such a group of setae, ovipositor and gonostyli hardly protruding caudally..... *Microterys flavus*

- Scutellum without a subapical group of dark coarse setae arranged in a more or less compact bundle, mesoscutum with a distinct transverse depression, body yellow, sides of propodeum, and mesopleura posteriorly more or less dark metallic..... *Diversinervus elegans*
- 11 Scape more than three times as long as board.....
..... *Parechthrodrinus coccidiphagus*
- Scape not more than three times as long as board..... 12
- 12 Mesoscutum and scutellum completely dark, not yellow, orange or pale brown, clava strongly obliquely truncate and clearly longer than tunicle..... *Baeoanusia* sp.
- Mesoscutum or scutellum or both at least partly yellow, orange or pale orange brown..... 13
- 13 Maxillary palpi 4-segmental, scape more than 2.5 times as long as wide..... *Metaphycus zebratus*
- Maxillary palpi 2-3segmented..... 14
- 14 Maxillary palpi 3-segmental, legs without annular darkish spots on tibiae, antennal scape about 3.5 times as long as the greatest width..... *Metaphycus flavus*
- Maxillary palpi 2-segmental, antennal scape with entire ventral margin..... *Metaphycus helvolus*
- Key of predators associated with pests attacking olive in Egypt**
1. Four membranous wings, with the forewings and hindwings about the same size, and with many veins. Adult green lacewings are pale green, about 12-20 mm long, with long antennae and bright, golden eyes. They have large, transparent, pale green wings and a delicate body..... *Chrysoperla carnea*
- Wings different 2
2. Wings not covered with scales, though they may be hairy, adults are tiny (1/8 inch) black bugs with white markings at the base of the front wings (hemelytra), resulting in a band-like appearance across the body when wings are at rest..... *Orius* sp.
- Forewings are modified into hard, leathery wing-cases (called *elytra*) that meet in a line down the back. The hind wings are membranous, folded beneath the *elytra*..... 3
3. Postcoxal line on first abdominal sternum curved forward at apex complete *Exochomus flavipes*
- Postcoxal line not curved forward at apex 4
4. Antennae short, dorsal surface densely pubescent *Scymnus syriacus*
- Antennae long 5
5. Antennae 8-segmented, the ladybird was bright orange in colour with dark edges on the wing-cover base. *Chilocorus bipustulatus*
- Antennae 7-segmented..... *Coccinella undecimpunctata*

ACKNOWLEDGEMENT

This work was sponsored by Egyptian- Moroccan Science and Technology in cooperation with Plant Protection Research Institute, Agricultural Research, Egypt and Faculty of Sciences, University of Moulay Ismail, Meknès, Morocco under project entitled " Augmentation and conversation of natural enemies of pests attacking crops in costal and wetland areas".

REFERENCES

- Abbassi, M. (1980): Recherche sur deux Homopteres fixes des Citrus, *Aonidiella aurantii* (Mask.) et *Aleurothrixus floccosus* (Mask.); les Cahiers de la Recherche Agronomique, 35 :168pp.

- Abbassi, M. (1996): Biologie et ecologie de la mineuse des feuilles de Citrus, *Phyllocnistis citrella* (Stainton), (Lepidoptera : Gracillariidae) au Maroc.C.R. au séminaire international sur la mineuse des agrumes, Blida, Algerie, 35 :168pp.
- Abbassi, M. (2006): Ravageurs sporadiques sur agrumes : la cochenille farineuse, la cochenille australienne et la cochenille plate. Agriculture du Maghreb, 16 :56-57.
- Abbassi, M. (2007): Principaux ravageurs sur fleurs et sur jeunes fruits noues de agrumes . Agriculture du Maghreb, 20 :90-94.
- Abbassi, M. (2008): Note au sujet de la ravageurs consideres comme secondaires au Maroc et aspects pratiques de lutte. Symposium Mediterranéen sur la Protection Phytosanitaire des Agrumes ,AMPP Institut Agronomique et Vétérinaire Hassan II Rabat, 2008 : 253-258.
- Abdel-Rahman, A G. (1995): Seasonal abundance of some pests attacking olives and their control under El-Qasr conditions, Matrouh Governorate. Annals of Agricultural Science, Moshtohor. 33(4): 1553-1564 .
- Abd-Rabou, S. (1999a): Parasitoids attacking the Egyptian species of armored scale insects (Homoptera : Diaspididae). Egypt. J. Agric. Res., 77(3): 1113-1129.
- Abd-Rabou, S. (1999b): Parasitoids attacking the Mediterranean black scale, *Saissetia oleae* (Hemiptera: Coccidae) in Egypt. Entomologica Bari, 33: 169-172.
- Abd-Rabou, S. (2001a): A survey of parasitoids associated with the hemispherical scale, *Saissetia coffeae* (Walker) (Hemiptera : Coccidae) in North-west Coastal area of Egypt. Bull. Fac. Agric. Cairo, Univ. Special Edition, 1-5.
- Abd-Rabou, S. (2001b): The effect of augmentative releases of indigenous parasitoids on populations of *Parlatoria oleae* (Clovee')(Homoptera : Coccidae) in olive groves in Egypt. Boll. Zool. Agr. Bahic, 33(3): 473-481.
- Abd-Rabou, S. (2004a): The role of augmentative releases of indigenous parasitoid *Metaphycus lounsburyi* (Hymenoptera: Encyrtidae) in enhancing the biological control of *Saissetia oleae* (Hemiptera: Coccidae) on olive in Egypt. Archives of Phytopathology and Plant Protection, 37(3): 233-237.
- Abd-Rabou, S. (2004b): Augmentative releases of indigenous parasitoids of the Mediterranean Black Scale *Saissetia oleae* (Oliver) (Hemiptera : Coccidae) on olive in Egypt. Shashpa, 11(1):51-56
- El-Hakim, A.M. and El-Sayed, S. (1985): Studies on the infestation of olive fruits with the olive fruit fly *Dacus oleae* Gmel, in Egypt (Tephritidae: Diptera). Bulletin de la Société Entomologique d'Egypte. (64): 221-225.
- Hamon, A. B. and Williams, M. C. (1984): The soft scale insects of Florida (Hom.: Coccoidea : Coccidae). Arthropoda of Florida and Neighbouring land ares, 11 194 pp.
- Hayat, M. (1998): Aphelinidae of India (Hymenoptera: Chalcidoidea): A Taxonomic Revision. Memoirs on Entomology, International, 13: viii + 416 pp.

- Noyes, J. S. (1982): Collecting and preserving chalcidid wasps (Hymenoptera : Chalcidoidea). Journal of Natural History, 16: 315-334.
- Noyes, J. S. and Hayat, M. (1994): Oriental mealybug parasitoids of the Anagyrini (Hymenoptera: Encyrtidae). C.A.B. International, Wallingford.
- Prinsloo, G.L. (1996): The genus *Comperiella* (Hymenoptera : Encyrtidae) in southern Africa: parasitoids of armoured scale insects (Homoptera : Diaspididae). African Entomology, 4(2): 153-160.
- Rosen, D. and DeBach, P. (1979): Species of *Aphytis* of the world (Hymenoptera: Aphelinidae). Dr. W. Junk KV Publisher, The Hague.
- Temerak, S. A. (1981): Historical records of parasitoids in Egypt (1905-1981). Techniaci Bulletin No. 1, Assiut Univ. Egypt, pp 80.

حصر لأهم الآفات و الأعداء الحيوية التي تصيب الموالح و الزيتون في المناطق الساحلية في المغرب و مصر
شعبان عيديره¹ و محمد عباسي²
¹ معهد بحوث وقاية النباتات ، مركز البحوث الزراعية ، الدقى ، جيزة
² كلية العلوم جامعة مولاي اسماعيل ، مكناس ، المغرب

تضمن هذا العمل دراسة حصر لأهم الآفات التي تصيب الموالح و الزيتون في مصر و المغرب. وقد وضحت النتائج أن الموالح و الزيتون تصاب بأربعة عشر و سبعة نوعا من الآفات على التوالي. و أن آفات الموالح يتطفل عليها ثمانية عشر نوعا من الطفيليات و إحدى عشر نوعا من المفترسات. و أن آفات الزيتون يرتبط بأحدى عشر طفيلا و خمسة من المفترسات و أن أهم الفصائل هي الأفيليند و الأنسرتيد و الأيوفيليد و البتيروماليد و التريكوماتيد (طفيليات) و أنتوكوزيد و الكوكسيليند و الكريزوبيدي و التترانيدى (مفترسات).

قام بتحكيم البحث

أ.د/ عبد البديع عبد الحميد غانم
كلية الزراعة - جامعة المنصورة
خارجي

أ.د/ منى عطية محمد