

INCIDENCE OF MITES ASSOCIATED WITH INSECTS IN SHARKEIA GOVERNORATE, EGYPT

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Abstract

Eighty two mite species were recorded in association with forty two insect species belonging to eight insect orders in Sharkeia governorate, Egypt. Those mites belong to 55 genera, 26 families, four suborders; Gamasida, Actinedida, Acaridida and Oribatida. The relationships between the collected mites and insects are classified into six categories; parasitism, parasitoidism, protelean parasitism, predatism, phoresy and fungivorous mites, some of these mites can play a great role in suppressing population of some insect pests.

INTRODUCTION

Biological control provides an environmentally safe, cost-effective, and energy-efficient means of pest control, either alone or as a component of integrated pest management. The predatory mites in the family Phytoseiidae are examples of biological control agents that have been recognized only recently as effective components of agricultural systems.

Many workers recorded several relationships occur between mites and insects could be put under any of the following categories; parasitism, parasitoidism, predatism, protelean parasitism, phoresy and fungivorous species. In each case of the first three categories; parasitism, parasitoidism and predatism, respectively, one individual gains from the interaction (the host) and the other loses (the prey). The difference between each case is that; a parasite does not kill its host in the process of achieving its own fitness, while parasitoid and predators invariably kill to achieve their ends. A parasitoid kills only one host in its life time while a predator kills more than one prey (Walter and Proctor, 1999). The fourth relation, protelean parasitism means that the individuals are parasitic only in the larval stage while they are free-living predators during their nymph and adult stages (Treat, 1975). The fifth relation, phoresy is defined as a phenomenon in which one animal actively seeks out and attaches to the outer surface of another animal for a limited time to dispersal from areas unsuitable for further development to another suitable place. The last relation is fungivorous mite species, means that individuals are found in soil, litter and insect nests where they feed on dead plants, fungus, moulting skins and animal tissues (Krantz, 1978). Some of those relationships may be useful in biological control leading

to reduce the pest population. On the other hand, they seem to be harmful when infesting the useful insects.

So, many acarologists are interested to clarify mites inhabited with insects and the types of relationships between them (El-Naggar, 1982, Wallace, 1986 and Ibrahim *et al.*, 1992).

The present work aims to record mites associated with some economic insects in Sharkeia Governorate to throw some light on the relationships between mites and the collected insects which could use in biological control of insect pests.

MATERIALS AND METHODS

Specimens of immature and adult stages of 42 insect species were collected from field crops, orchards, ornamental plants, stored products and bee hives in addition to the nests of some insects from Sharkeia Governorate, Egypt, during three successive years of 2003- 05.

The flying insects were collected by the sweeping net or light traps and put in a killing bottle containing a small piece of cotton wool soaked in chloroform, while the insect nests, plant vegetations, debris and the stored products were kept in paper bags and transferred to the laboratory.

Immature and adult stages carefully inspected under a stereomicroscopic binocular microscope, while nests, stored products and debris were extracted using Tullgren's funnels.

Mites were kept in lactic acid for clearing before mounting in Hoyer's medium contains few drops of iodine. Mites were identified to the family level according to the key given by Krantz, 1978 and to the genera and species level using different specific keys: Lindquist and Evans, 1965 for phytoseiids; Smiley, 1992 for cunaxids; Baker, 1965 for tydeids; Mahunka, 1970 for tarsonemids, Summers and Price, 1970 for cheyletids; Summers, 1966 for raphignathoids; Hughes, 1961 for acaridids; Balogh, 1972, for oribatids and Zaher, 1986 for the recorded Egyptian species.

RESULTS AND DISCUSSION

This incidence proved the occurrence of 82 mite species associated with 42 insect species or inside their nests which collected from Sharkeia Governorate (Table 1). The collected mites belong to 55 genera, 26 families, four suborders as follows:

The suborder Gamasida was represented by 30 species belonging to 5 families; Ascidae, Phytoseiidae, Eviphididae, Macrochelidae and Varroidae.

The suborder Actinedida was resembled by 39 species belonging to 13 families; Cunaxidae, Tydeidae, Pyemotidae, Acarophenacidae, Pygmephoridae, Scutacaridae,

Podapolipidae, Tarsonemidae, Acarapidae, Eupalopsellidae, Cheyletidae, Stigmaeidae and Trombididae.

The suborder Acaridida was represented by 8 species belonging to three families; Hemisarcoptidae, Acaridae and Glycyphagidae.

The suborder Oribatida was represented by 5 species belonging to three families; Brachychthoniidae, Haplozetidae and Oribatulidae.

Those mites were recorded in association with one or more of the collected 42 insect species. The insects belong to the orders Orthoptera, Hemiptera, Homoptera, Thysanoptera, Lepidoptera, Coleoptera, Diptera and Hymenoptera.

The relationships between mites and the collected insects are classified into six categories:

- 1- Predatism is represented by 22 mite species belonging to suborders, Gamasida, Actinedida and Acaridida.
- 2- Parasitism is represented by 7 mite species belonging to suborders Gamasida and Actinedida.
- 3- Parasitoidism is resembled by 5 mite species belonging to suborder Actinedida.
- 4- Protelean parasitism is represented by 6 species belonging to suborder Actinedida.
- 5- Phoresy is represented by 6 mite species belonging to suborder Gamasida.
- 6- Fungivorous species is represented by 35 mite species belong to suborders Gamasida, Actinedida, Acaridida and Oribatida.

The most common species associated with insects were fungivorous and predaceous mites. On the other hand, the mite population associated with orthopterous, homopterous, coleopterous and hymenopterous were the highest while the hemipterous, thysanopterous, lepidopterous and dipterous insects were the lowest.

This study mentioned that there are many beneficial mites; predaceous, parasitic and parasitoid which can play an important role in biological control of some insect pests. In addition, there are some mite species of the fungus feeders can be transmitting certain insect pathogens.

Table 1. Incidence of mites associated with the collected insects during three successive years from 2003 – 05 in Sharkeia Governorate, Egypt.

Mite species	Insect host	Habitat (site of occurrence)	Relationship
Suborder: Gamasida Fam. Ascidae Voigts and Oudemans <i>Protogamasellus denticus</i> Nasr	<i>Cataglyphus bicolor</i> Fab. (Formicidae, Hymenoptera)	The host nest	Fungivorous?
<i>P. bifurcatus</i> Genls, Loots & Ryke	<i>Rhynchophorus ferrugineus</i> (Oliv.) (Curculionidae, Coleoptera)	The host cocoon	Fungivorous?
<i>Gamaselodes bicolor</i> Berlese	<i>Trophota squallida</i> Scop. (Scarabaeidae, Coleoptera)	Beneath the elytra	Fungivorous
<i>Proctolaelaps pygmaeus</i> (Müller)	<i>Gryllus domesticus</i> (L.) (Gryllidae, Orthoptera)	Beneath the wings	Fungivorous
<i>P. orientalis</i> Nasr	<i>Gryllus domesticus</i> (L.) (Gryllidae, Orthoptera)	Beneath the wings	Fungivorous?
<i>P. hystrix</i> Samšinek	<i>Gryllus domesticus</i> (L.) (Gryllidae, Orthoptera)	Beneath the wings	Fungivorous?
<i>P. aegyptiacus</i> Nasr	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	On the upper host body	Fungivorous
<i>Lastoseius lindquisti</i> Nasr & Abou- Awad	<i>I. seychellarum</i> (Westwood) (Margarodidae, Homoptera)	On the upper host body	Predator
<i>Blattisocius keegani</i> Fox	<i>Strophilus orayzae</i> L. (Curculionidae, Coleoptera)	Granaries	Predator
Fam. Phytoseiidae Berlese <i>Euseius scutalis</i> (Athias-Henriot)	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Around the host body	Predator
	<i>Gynaikothrips ficorum</i> Marshall (Phleothripidae, Thysanoptera)	Host colony	Predator
	<i>Planoccus citri</i> (Risso) (Pseudococcidae, Homoptera)	Host colony	Predator
	<i>Bemisia tabaci</i> (Genn.) (Aleyrodidae, Homoptera)	Host colony	Predator
<i>E. hutu</i> (Pritchard & Baker)	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Around the host body	Predator
	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Host colony	Predator
<i>Amblyseius swirskii</i> Athias- Henriot	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	On the upper host body	Predator
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	On the upper host body	Predator
	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	On the upper host body and in the eggs sac	Predator

? = The exact relationship is unknown.

Table 1. Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
<i>A. muma</i> Shehata & Zaher	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Around the host body	Predator
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Around the host body	Predator
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Around the host body	Predator
	<i>Parlatoria oleae</i> Colvée (Diaspididae, Homoptera)	Around the host body	Predator
	<i>Planococcus citri</i> (Risso) (Pseudococcidae, Homoptera)	Host colony	Predator
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Around the host body	Predator
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Around the host body	Predator
<i>A. cucumeris</i> (Oudemans)	<i>Gynaikothrips ficorum</i> Marshall (Phleothripidae, Thysanoptera)	Host colony	Predator
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Around the host body	Predator
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Around the host body	Predator
<i>A. cydnodactylon</i> Shehata & Zaher	<i>Hemibertesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Beneath the host scale	Predator
	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	Around the host body	Predator
	<i>Ceroplastes floridensis</i> Comstock (Coccidae, Homoptera)	Around the host body	Predator
<i>Typhlodromus cordiae</i> Muma	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Around the host scale	Predator
	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	Around the host body	Predator
<i>T. pelargonicus</i> El-Badry	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Around the host body	Predator
Fam. Eviphididae Berlese <i>Scarabaspis</i> sp.	<i>Scarabaeus sacer</i> L. (Scarabaedidae, Coleoptera)	Attached to the ventral side of dead insects.	Phoretic
Fam. Macrochelidae Vitzthum <i>Macrocheles sembelawanii</i> Hafez, El-Badry & Nasr	<i>Pentodon deserti</i> Hey. (Scarabaedidae, Coleoptera)	Attached to the ventral side in the coxal regions	Phoretic
	<i>Scarabaeus sacer</i> L. (Scarabaedidae, Coleoptera)	Attached to the ventral side in the coxal regions	Phoretic

Table 1. Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
Fam. Varroidae Delfinado & Baker <i>Varrao jacobsoni</i> Oudemans	<i>Apis mellifera</i> L. (Apidae, Hymenoptera)	Ectoparasite on workers and brood of honey bees	Parasite
Fam. Laelapidae Berlese <i>Andriolaelaps aegypticus</i> Hafez, El-Badry & Nasr	<i>Liogryllus bimaculatus</i> (de Geer) (Gryllidae, Orthoptera)	Beneath the wings	Fungivorous
<i>A. reticulatus</i> Hafez, El-Badry & Nasr	<i>Cataglyphus bicolor</i> Fab. (Formicidae, Hymenoptera)	Attached to the thorax and abdomen of the host	Fungivorous
<i>Hypoaspis sardoa</i> (Berlese)	<i>Cataglyphus bicolor</i> Fab. (Formicidae, Hymenoptera)	Inside the nest	Fungivorous?
<i>H. arabicus</i> Hafez, El-Badry & Nasr	<i>Scaurus aegypticus</i> Sal. (Tenebrionidae, Coleoptera)	In the antennal knob of the host	Phoretic?
<i>H. guenestandicus</i> (Womersly)	<i>Rhynchophorus ferrugineus</i> (Oliv.) (Curculionidae, Coleoptera)	In the host cocoon	Fungivorous?
<i>H. wahabi</i> Metwally & Ibrahim	<i>Blaps polychresta</i> Forsk. (Tenebrionidae, Coleoptera)	Attached to the host ventral abdomen	Phoretic
<i>Dinogamasus inflatus</i> Leveque	<i>Xylocopa aestuans</i> L. (Apidae, Hymenoptera)	In special abdominal pouch (Acarinarium)	Phoretic
<i>Cosmolaelaps keni</i> Hafez, El- Badry & Nasr	<i>Rhynchophorus ferrugineus</i> (Oliv.) (Curculionidae, Coleoptera)	In the host cocoons	Fungivorous?
Fam. Uropodidae Berlese <i>Uroobovella (Fuscuropada)</i> <i>marginata</i> (Koch)	<i>Rhynchophorus ferrugineus</i> (Oliv.) (Curculionidae, Coleoptera)	In the host cocoons	Phoretic
<i>Uropoda minima</i> Kramer	<i>Rhynchophorus ferrugineus</i> (Curculionidae, Coleoptera)	Beneath the elytra	Phoretic
Suborder: Actinedida Fam. Cunaxidae Thor <i>Pulaeus glebulentus</i> Den Heyer	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	Beneath the host body	Predator
<i>Cunaxa setirostris</i> (Hermann)	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Predator
	<i>Coccus acumenatus</i> (Signoret) (Coccidae, Homoptera)	Around the host body	Predator
Fam. Tydeidae Kramer <i>Tydeus starri</i> Baker & Wharton	<i>Eyprepocnemis plorans</i> (Charp.) (Acrididae, Orthoptera)	Beneath the wings	Fungivorous?
<i>T. (T.) californicus</i> (Banks)	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	On the lower host body	Fungivorous?
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Host colony	Fungivorous

Table 1: Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
	<i>Hemiberlesia lataniae</i> (Signoret) (Homoptera, Diaspididae)	Host colony	Fungivorous
<i>T. (T.) kochi</i> Oudemans	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
<i>Paralorryia ferula</i> (Baker)	<i>Eyprepocnemis plorans</i> (Charp.) (Acrididae, Orthoptera)	Beneath the wings	Fungivorous
	<i>Iceya purchasi</i> Maskell (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Iceya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Pulvinaria psidii</i> Maskell (Diaspididae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Host colony	Fungivorous?
	<i>Gynaikothrips ficorum</i> Marshall (Phleothripidae, Thysanoptera)	Host colony	Fungivorous?
<i>Pronematus ubiquitous</i> (McGregor)	<i>Eyprepocnemis plorans</i> (Charp.) (Acrididae, Orthoptera)	Beneath the wings.	Predator?
<i>P. rykei</i> Meyer & Rodriguez	<i>Oxycarenus hyalinipennis</i> Costa (Lygaeidae, Hemiptera)	Inside the dry pod of okra	Predator?
Fam. Pyemotidae Oudemans <i>Pyemotes herfsi</i> (Oudemans)	<i>Sitotroga cerealella</i> (Olivier) (Gelechiidae, Lepidoptera)	Attacks larvae and adults of the host in the laboratory culture.	Parasitoid
<i>P. tritici</i> (La Greze-Fossat & Montane)	<i>Pectinophora gossypiella</i> (Saunders) (Gelechiidae, Lepidoptera)	Attachment with the first instar larvae of the host.	Parasitoid
<i>Metasiteroptes polistesi</i> Soliman & Kandeel	<i>Polistes gallica</i> L. (Vespidae, Hymenoptera)	The host nest	Parasitoid
Fam. Acarophenacidae Cross <i>Acarophenax bruchidisui</i> Kandeel & Nassar	<i>Tribolium castaneum</i> (Herbst.) (Tenebrionidae, Coleoptera)	Beneath the elytra.	Parasitoid
<i>Adactylidium gynaikothripsi</i> Zaher & Kandeel	<i>Gynaikothrips ficorum</i> Marshall (Phleothripidae, Thysanoptera)	Host colony	Parasitoid
Fam. Pygmephoridae Cross <i>Pediculaster gallinae</i> Zaher & Kandeel	<i>Musca domestica</i> L. (Muscidae, Diptera)	Between bases of the front wing.	Parasite
Fam. Scutacaridae Oudemans <i>Scutacarus aegypticus</i> Yousef & Metwally	<i>Cataglyphus bicolor</i> Fab. (Formicidae, Hymenoptera)	The host nest.	Fungivorous
Fam. Podapolipidae Oudemans <i>Podapolipoides acrotylus</i> Kandeel, El-Zohairy, Amir & Ibrahim	<i>Eyprepocnemis plorans</i> (Charp.) (Acrididae, Orthoptera)	On the intersegmental membrane under the wings.	Parasite

Table 1: Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
<i>Tetrapolipus rhynchophori</i> (Ewing)	<i>Aiolopus strepens</i> (Latr.) (Acrididae, Orthoptera)	On the intersegmental membrane under the wings	Parasite
	<i>Acrotylus insubricus</i> (Scop.) (Acrididae, Orthoptera)	Beneath the wings	Parasite
	<i>Eyprepocnemis plorans</i> (Acrididae, Orthoptera)	On the intersegmental membrane under the wings	Parasite
	<i>Aiolopus strepens</i> (Latr.) (Acrididae, Orthoptera)	On the intersegmental membrane under the wings	Parasite
<i>Bakerpolipus coccinellai</i> Kandeel, El-Naggar & El- Kawass	<i>Coccinella</i> <i>undecimpunctata</i> L. (Coccinellidae, Coleoptera)	On the intersegmental membrane under the elytra	Parasite
<i>Archipolipus eyprepocnemisi</i> Kandeel, El-Naggar & El- Kawass.	<i>Eyprepocnemis plorans</i> (Charp.) (Acrididae, Orthoptera)	On the intersegmental membrane under the wings	Parasite
Fam. Tarsonemidae Kramer <i>Tarsonemus idaeus</i> Suski	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
<i>T. bifurcatus</i> Schar.	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
<i>T. mycellophagus</i> Hus.	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Fungivorous
<i>T. pauperosetus</i> Suski	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	Beneath the host body	Fungivorous
	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
	<i>Gryllus domesticus</i> (L.) (Gryllidae, Orthoptera)	Beneath the wings.	Fungivorous?
	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
	<i>Spodoptera littoralis</i> (Boisd.) (Noctuidae, Lepidoptera)	On head and thorax of dead moths	Fungivorous
<i>Xenotarsonemus belemnitoides</i> (Weis-Fogh)	<i>Coccinella septempunctata</i> L. (Coccinellidae, Coleoptera)	Beneath the elytra.	Fungivorous?

Table 1. Cont.

Mite species	Insect host	Habitat (site of occurrence)	Relationship
<i>Lupotarsonemus myceliophag</i> (Hussey)	<i>Coccus acuminatus</i> (Signoret) (Coccidae, Homoptera)	On the upper host body	Fungivorous?
	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Beneath the host scale	Fungivorous?
Fam. Acarapidae Mahunka <i>Acarapis woodi</i> (Rennie)	<i>Apis mellifera</i> L. (Apidae, Hymenoptera)	Within the great tracheal trunks of the mesothorax which ends at the first pair of spiracles	Parasite
Fam. Eupalopsellidae Willmann <i>Eupalopsellus olearius</i> Zaher & Gonia	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Beneath the host scale	Predator
<i>Saniosulus nudus</i> Summers	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Beneath the host scale	Predator
Fam. Cheyletidae Leach <i>Cheletogenes ornatus</i> (Can. & Fanz.)	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	In the eggs sac	Predator
<i>Cheyletus malaccensis</i> Oudemans	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Around the host scale	Predator
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Around the host scale	Predator
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Around the host scale	Predator
	<i>Parlatoria oleae</i> Colvée (Diaspididae, Homoptera)	Around the host scale	Predator
	<i>Tribolium castaneum</i> (Herbst.) (Tenebrionidae, Coleoptera)	Granaries	Predator
<i>Cheyletomorpha lepidopterorum</i> (Shaw)	<i>Tenebrio molitor</i> L. (Tenebrionidae, Coleoptera)	Granaries	Predator
	<i>Sitophilus oryzae</i> L. (Curculionidae, Coleoptera)	Granaries	Predator
	<i>Oxycarenus hyalinipennis</i> Costa (Lygaeidae, Hemiptera)	Inside the dry pods of okra	Predator
Fam. Stigmaeidae Oudemans <i>Agistemus vulgaris</i> Soliman & Gonia	<i>Coccus acuminatus</i> (Signoret) (Coccidae, Homoptera)	On the upper host body	Predator
<i>A. exsertus</i> Gonz.	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Predator
	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	Beneath the host body	Predator
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Beneath the host scale	Predator

Table 1. Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
	<i>Aulacaspis</i> sp. (Diaspididae, Homoptera)	Beneath the host scale	Predator
Fam. Trombididae Leach <i>Trombidium</i> sp.1	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Beneath the host scale	Protelean parasite
<i>Trombidium</i> sp.2	<i>Blaps polychresta</i> Forsk. (Tenebrionidae, Coleoptera)	Attachment on the ventral side in the coxal regions	Protelean parasite
<i>Allothrombium</i> sp.1	<i>Musca domestica</i> L. (Muscidae, Diptera)	Beneath the front wing	Protelean parasite
<i>Allothrombium</i> sp.2	<i>Gryllus domestica</i> (L.) (Gryllidae, Orthoptera)	Beneath the wings	Protelean parasite
<i>Allothrombium</i> sp.3	<i>G. domestica</i> (Gryllidae, Orthoptera)	Beneath the wings	Protelean parasite
<i>Allothrombium</i> sp.4	<i>Acrotylus insubricus</i> (Scop.) (Acrididae, Orthoptera)	Beneath the wings	Protelean parasite
	<i>Lepidosaphes pallida</i> (Maskell) (Diaspididae, Homoptera)	Beneath the host scale	Protelean parasite
Suborder: Acaridida Fam. Hemisarcoptidae Oud. <i>Hemisarcoptes malus</i> (Shimer)	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Aggregating beneath the scale dead insect	Predator
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Aggregating beneath the scale dead insect	Predator
	<i>Hemiberlesia lataniae</i> (Signoret) (Homoptera, Diaspididae)	Aggregating beneath the scale dead insect	Predator
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Aggregating beneath the scale dead insect	Predator
Fam. Acaridae Ewing & Nesbitt <i>Aleuroglyphus ovatus</i> (Troupean)	<i>Tenebrio molitor</i> L. (Tenebrionidae, Coleoptera)	Granaries	Fungivorous
	<i>Oxycareus hyalinipennis</i> Costa (Lygaeidae, Hemiptera)	Inside the dry pod of okra	Fungivorous?
<i>Tyrophagus putrescentiae</i> (Schrank)	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Beneath the host body	Fungivorous?
	<i>Coccus acumenatus</i> (Signoret) (Coccidae, Homoptera)	Around the body host	Fungivorous?
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Around the host scales	Fungivorous?

Table 1. Cont.:

Mite species	Insect host	Habitat (site of occurrence)	Relationship
	<i>Parlatoria ziziphi</i> (Lucas) (Diaspididae, Homoptera)	Around the host scales	Fungivorous?
	<i>Aphis craccivora</i> Koch (Aphididae, Homoptera)	Around the honey dew of the host	Fungivorous?
	<i>Gynaikothrips ficorum</i> Marshall (Phleothripidae, Thysanoptera)	In the host colony	Fungivorous
	<i>Spodoptera littoralis</i> (Boisd.) (Noctuidae, Lepidoptera)	On the thorax and abdomen of the dead moths	Fungivorous
<i>Thyreophagus entomophagus</i> (Laboulbène)	<i>Asterolecanium pustulans</i> (Cockerell) (Asterolecaniidae, Homoptera)	Around and under the host scales	Fungivorous
	<i>Aonidiella aurantii</i> Maskell (Diaspididae, Homoptera)	Around and under the host scales	Fungivorous
	<i>Hemiberlesia lataniae</i> (Signoret) (Diaspididae, Homoptera)	Around and under the host scales	Fungivorous?
	<i>Parlatoria oleae</i> Colvée (Diaspididae, Homoptera)	Around and under the host scales	Fungivorous
<i>Caloglyphus krameri</i> (Bert.)	<i>Oxycarenum hyalinipennis</i> Costa (Lygaeidae, Hemiptera)	Inside the dry pod of okra	Fungivorous
<i>Sudasia nesbitti</i> Hughes	<i>Sitophilus oryzae</i> L. (Curculionidae, Coleoptera)	Granaries	Fungivorous?
Fam. Glycyphagidae Berlese			
<i>Ctenoglyphus blapsi</i> Kandeel, El-Naggar & El-Kawass	<i>Apis mellifera</i> L. (Apidae, Hymenoptera)	On the abdomen and in the hive debris	Fungivorous
	<i>Blaps polychresta</i> Forsk. (Tenebrionidae, Coleoptera)	Attachment on the ventral side of the host.	Fungivorous?
<i>C. hughesi</i> Attiah	<i>Apis mellifera</i> L. (Apidae, Hymenoptera)	Hive debris	Fungivorous
Suborder: Oribatida			
Fam. Brachychthoniidae Thor			
<i>Eobrachychthonius aegyptiacu</i> Kandeel, El-Naggar & El-Kawass	<i>Icerya seychellarum</i> (Westwood) (Margarodidae, Homoptera)	Around and under the host body	Fungivorous?
	<i>Pulvinaria psidii</i> Maskell (Coccidae, Homoptera)	Around and under the host body	Fungivorous
	<i>Lepidosaphes beckii</i> Newman (Diaspididae, Homoptera)	Beneath the scales of the host	Fungivorous
Fam. Haplozetidae Grandjean			
<i>Perxylobates obesus</i> Bayoumi	<i>Rhynchophorus ferrugineus</i> (Curculionidae, Coleoptera)	The host cocoon	Fungivorous
Fam. Oribatulidae Jacot			
<i>Siculobata sicula</i> (Berlese)	<i>Icerya purchasi</i> Maskell (Margarodidae, Homoptera)	Beneath the host body	Fungivorous
<i>Zygoribatula sayedi</i> El-Badry & Nasr	<i>Oxycarenum hyalinipennis</i> (Lygaeidae, Hemiptera)	Inside the dry pod of okra	Fungivorous
<i>Z. tameyai</i> El-Badry & Nasr	<i>Coccis acumenatus</i> (Coccidae, Homoptera)	Around the host body	Fungivorous

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حصص للأكاروسات المرتبطة بالحشرات في محافظة الشرقية، مصر

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تم حصص للأكاروسات المرتبطة بـ ٤٢ نوع من الحشرات التي جمعت من محافظة الشرقية سواء من الحقول أو بساتين الفاكهة أو نباتات الزينة أو المواد المخزونة أو عشوش بعض أنواع الحشرات.

و سجل ٨٢ نوع من الأكاروسات يضمها ٥٥ جنسا و تنتمي لـ ٢٦ عائلة، وتم توضيح أماكن تواجدها علي جسم عائلها الحشري أو الوسط الذي تتواجد فيه مصاحبة له بالإضافة إلي تحديد نوع العلاقة بينهما ، حيث قسمت إلي ستة أنواع من العلاقات هي التطفل المتعدد parasitism والتطفل الأولى parasitoidism والتطفل بواسطة الطور اليرقي للتطفل حيث أن الأطوار الأخرى مفترسات حرمة protelean parasitism و الإقتراس predatism والإنتقال phoresy و الأكاروسات فطرية التغذية fungivorous mites.