

Species Composition and Diversity of Mites Inhabiting Pomegranate Orchards at Assiut, Upper Egypt

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ABSTRACT

Mites play an important role in the biological cycle of nature, as well as in the agricultural cycles of plants. They are considered to be very important for most plants, especially fruit orchards, which case both, qualitative and quantitative losses, they also cause different types of allergenic reactions among the fruit handles and farmers. A comprehensive survey of mites inhabiting pomegranate orchards at Assiut and its suburbs was conducted in the work herein. During the current work, colonies of the pomegranate false spider mite, *Tenuipalpus punicae* Pritchard & Baker and the mango spider mite, *Oligonychus mangiferus* (Rahman & Sapra) were recorded on pomegranate trees at Assiut governorate. The relative abundance of both mite species and their natural enemies was conducted. Based on previous studies, about 24 mite species in nine families were recorded in Egypt. In order to determine species composition of phytophagous and predacious mites on pomegranate trees, samples were taken from leaves, buds and fruits during 2018/2019 and 2019/2020 seasons. The citrus brown mite, *Eutetranychus orientalis* (Klein); *T. punicae* and the broad mite, *Polyphagotarsonemus latus* (Banks) seemed to be the most common phytophagous mites on pomegranate trees. On the other side, several predatory mite species were also recorded in the present work. Of these, *Amblyseius swirskii* Athias-Henriot; *Euseius scutalis* (Athias-Henriot); *Typhlodromus (Typhlodromus) pyri* Scheuten; *Neoseiulus barkeri* Hughes (Phytoseiidae), and *Agistemus exsertus* Gonzalez (Stigmaeidae), all were recorded in large numbers, especially on pomegranate leaves of all varieties. While *Cheletogenes ornatus* (Canestrini & Fanzago) and *Cheletomimus bakeri* (Ehara) (Cheyletidae) were recorded mostly on leaves and fruits. Quantifying the occurrence of various predacious mite species on pomegranate trees, may be of great importance to reduce the number of phytophagous ones. In separated subsequent studies, the efficacy of these predatory mites can be estimated as one of the biological control agents.

Key words: Acari; species composition; diversity; mites; pomegranate; Egypt.

INTRODUCTION

Pomegranate (*Punica granatum* L.) (Lythraceae) comprises about 500 cultivars worldwide (Stover and Mercure, 2007). It differs from all fruits in having pink small flowers and less sweet fruits. Pomegranate is used as fresh fruits or in baking, beverages and cooking. Moreover, it is largely used for healing from several diseases across different cultures and civilizations (Bhowmik et al., 2013). It has been mentioned many times in Holly Quran. Extracts of different parts of pomegranate plants and fruits have several nutritive, industrial, medicinal values and some pharmacological properties, where the extract contains hypertensive, antispasmodic and anthelmintic properties as well. The pomegranate orchards are liable to be attacked by several mite pests in Egypt, such as: the pomegranate flat mite, *Brevipalpus lewisi* (McGregor); the pomegranate false spider mite, *Tenuipalpus punicae* Pritchard & Baker and the pomegranate eriophyid mite, *Aceria granati* (Canestrini & Massalongo). Those pests attacking pomegranates, and can make holes and bores in the fruits, feeding on the berries to attract other mites and fungi. The essential taxonomic studies of agricultural mites in Egypt are extremely poor resulting in insufficient information concerning the biology and ecology of plant feeders and predatory mites (Zaher and El-Badry, 1962; Mohamed, 1963; Rasmy et al., 1972; Mohamed, 2018; Desokey et al., 2020). Such

information are required for successful Integrated Pest Management (IPM) programs. Moreover, these information will help improvement of the recently introduced programs to Egypt such as organic farming and biological control (Saleh et al., 2015; Adly, 2016; Abdelgayed et al., 2017; Elhalawany et al., 2017). A few numbers of phytophagous mite species had been previously reported on pomegranate trees in Egypt (Zaher et al., 1971; Rasmy et al., 1972; Zaher and Yosef, 1972). Yet, no predatory mites on pomegranate trees had been recorded. However, some predatory mites had been found on different plants other than on pomegranate (Zaher et al., 1971; Rasmy et al., 1972; Zaher and Yosef, 1972; Zaher, 1984a,b; 1986; Abo-Shnaf, 2005; Abo-Shnaf and Moraes, 2014; Abdelgayed, 2017). However, the previously mentioned studies did not provide enough information concerning either the description or the distribution of these mites. In addition, neither illustrated keys nor deposited specimens were available. Therefore, the objectives of the present work were to investigate phytophagous and predacious mite species associated with seven varieties of pomegranate trees covering different localities at Assiut governorate and its suburbs, and to take notes on occurrence period and distribution of such mites on different plants and localities. The identified mites presented in this work can be helpful in further investigations concerning mite fauna in Egypt.

MATERIALS AND METHODS

Samples were taken during October 2018 till May 2020, in 11 districts at Assiut Governorate. Mites occurred on plant parts (i.e., leaves, fruits, branches, buds) of different varieties of *Punica granatum* L. (such as: Araby, Assiuty, Manfalouty, Hegazy, Nab El-Gamal, Taffiy and Wardy), in addition to Bermuda grass, *Cynodon dactylon* L. (Poaceae) grown under the pomegranate trees. Mites were collected by direct observation under a stereoscopic microscope and by using specialized hand-held aspirators (BioQuip®, CA, USA). Soon after, the plant materials were put in Berlese's funnels. The extracted mites were cleared in lactic acid, mounted on microscopic slides using Hoyer's medium and examined under (BH-2, Olympus®, Japan) research microscope. Mites were identified using the world taxonomic literature. The voucher specimens were deposited in the Acari collection of the Department of Plant Protection, Faculty of Agriculture, Assiut University, Egypt.

RESULTS AND DISCUSSION

The present work showed the presence of 175 mite species belonging to 48 families on pomegranate trees at Assiut Governorate, Upper Egypt (Table 1). Of these, twenty-seven phytophagous mite species pertaining to three families (i.e., Tarsonemidae, Tenuipalpidae and Tetranychidae); ninety-two mite species in 22 families composed mostly of predaceous mites (Amroseiidae, Anystidae, Ascidae, Bdellidae, Blattisociidae, Cheyletidae, Cunaxidae, Digmasellidae, Erythraidae, Eupalopsellidae, Halolaelapidae, Laelapidae, Macrochelidae, Melicharidae, Ologamasidae, Pachylaelapidae, Parasitidae, Phytoseiidae, Sejidae, Stigmaeidae, Uropodidae and Veigaiidae), and 57 species in 23 families of diverse feeding habits (Acaridae, Brachychthonidae, Caligonellidae, Camerobiidae, Ereyinetidae, Eupodidae, Galumnidae, Hemisarcopidae, Histiostomatidae, Hypochthoniidae, Iolinidae, Lohmannidae, Microtrmbidiidae, Nothridae, Oplitidae, Oppiidae, Oribatulidae, Pygmophoridae, Schelorbitidae, Scutacaridae, Trombiculidae, Trombididae and Tydeidae). The pomegranate false red mite, *Tenuipalpus punicae* Pritchard & Baker, primarily a pest of pomegranate trees and reported from many parts worldwide. This species was firstly reported in Egypt by Sayed (1942). It feeds on the upper and lower sides of pomegranate's leaves and on fruits close to the midrib. It widespread on pomegranate trees at Assiut Governorate (Abdelgayed *et al.*, 2019). On the other hand, the grape false red mite, *Tenuipalpus granati* Sayed is a harmful pest on pomegranate and grape-vine orchards

in globe including Egypt (Sayed, 1946; Zaher and El-Badry, 1964; Zaher *et al.*, 1970, 1971; Rasmy *et al.*, 1972; Zaher and Yosef, 1972; Wahba *et al.*, 1982).

The citrus brown mite, *Eutetranychus orientalis* (Klein), was a second harmful pest of pomegranate, it was reported from many parts of the world and it was firstly recorded in Egypt by Sayed (1942), this species prefers feeding on upper side of leaves close to the midrib. It always found on citrus trees at Assiut Governorate (Salman *et al.*, 1975). Certain pomegranate varieties are liable to be severely infested with citrus brown mite. The broad mite, *Polyphagotarsonemus latus* (Banks), seemed to be an important pest on pomegranate trees cultivated in both Abou-Teig and Assiut cities, based on its high densities and subsequent discoloration of leaves. The phytophagous flat mites, *Cenopalpus pulcher* (Canestrini & Fanzago); *Phyllozetanuchus aegyptiacus* Sayed and *T. eriophyoides* Baker were also infested pomegranate leaves, but in moderate at Assiut districts. Eraky (1994) described the new mite species, *Histiostoma rizkii* on pomegranate fruits at Assiut Governorate.

The surveyed predaceous mite species recorded on pomegranate trees were belonging to the families: Phytoseiidae, Stigmaeidae and Cheyletidae. The *Amblyseius swirskii*; *E. scutalis* and *T. (T.) pyri* were the most numerous phytoseiid species commonly found on pomegranate leaves of the pomegranate varieties: Assiuty, Araby and Manfalouty "Baladi", searching on their suitable prey (i.e., *E. orientalis*; *O. mangiferus* and *T. punicae*). The *Neoseiulus barkeri* was found on Bermuda grass, *C. dactylon* directly in association with the pomegranate whitefly, *Siphoninus phillyreae* (Haliday); the pomegranate aphid, *Aphis punicae* Passerini and the grape thrips, *Rhipiphorothrips cruentatus* Hood. The *E. scutalis* was recorded as predator on both *E. orientalis* and *Brevipalpus obovatus* Donnadieuin (Donia *et al.*, 1995), they may work well against *T. punicae*. Among other recorded predators, *Cheletogenes ornatus* and *Cheletomimus bakeri* were found in high numbers on pomegranate leaves and fruits of pomegranate varieties (i.e., Araby and Manfalouty). Also, the *Cheletomimus bakeri* was recorded feeding on citrus red mite, *Panonychus citri* (McGregor) in Ehime prefecture of Japan (Razaq *et al.*, 2001), this indicated that, this species may act well against *T. punicae*. On the other side, Mesbah and Omer (2014) studied the life-table parameters of *Cheletogenes ornatus* reared on the red palm mite, *Raoiella indica* and date scale-insect, *Parlatoria blanchardii* (Targ.). Also, Zaher *et al.* (1981); and Moraes *et al.* (1989) recorded that, *Cheletogenes ornatus* was noticed to be associated with tenuipalpid mites.

Table (1). List of mite species reported from pomegranate orchards at Assiut, Upper Egypt

Mite taxa	Varieties of pomegranate	Locality*	Incidence**
Acaridae Latreille			
<i>Acotyledon manuri</i> Eraky	Assiuty, Manfalouty (Baladi)	1	++
<i>A. nerminka</i> Eraky	Assiuty, Manfalouty, Wordy	1	++
<i>Caloglyphus citri</i> Eraky <i>et al.</i>	Araby, Nab El-Gamal	2, 3	+
<i>Cosmoglyphus manuri</i> Negm	Manfalouty, Wordy	1, 2	+
<i>Forcellinia mahunkai</i> Eraky	Araby	1	++
<i>Rhizoglyphus echinopus</i> (Fumouze & Robin)	Manfalouty	1	+
<i>R. robini</i> Claparède	Assiuty, Wordy	1	+
Ameroseiidae Evans			
<i>Ameroseius aegypticus</i> El-Badry, Nasr & Hafez	Araby, Nab El-Gamel	1	++
<i>Kleemannia kosi</i> El-Badry, Nasr & Hafez	Assiuty, Mafalouty	1, 2, 10, 11	++
<i>K. nova</i> Nasr & Abou-Awad	Assiuty	1, 2	++
<i>K. parplumosa</i> Nasr & Abou-Awad	Assiuty	1	++
<i>K. plumosa</i> (Oudemans)	Araby, Mafalouty	1, 2	+++
<i>Sertitympanumaegyptiacum</i> Nasr & Abou-Awad	Manfalouty	2, 11	++
<i>S. zaheri</i> (El-Badry, Nasr & Hafez)	Assiuty	9	+
Anystidae Oudemans			
<i>Anystis baccharum</i> Linnaeus	Araby	1, 2, 10	+
<i>Paratarsotomus macropalpis</i> (Banks)	Nab El-Gamal	1	+
Ascidae Voigts & Oudemans			
<i>Arctoseius bilinear</i> Nasr	Nab El-Gamel	1	+
<i>Gamasellodes bicolor</i> (Berlese)	Assiuty, Hegazy, Mafalouty, Nab El-Gamel	1, 2, 8	++
<i>G. zaheri</i> Nasr	Manfalouty, Nab El-Gamel	1, 2	+
<i>Protogamasellus denticus</i> Nasr	Assiuty	1, 2	+
<i>P. minutus</i> Nasr	Manfalouty	2	+
Bdellidae Dugès			
<i>Cyta latirostris</i> (Hermann)	Manfalouty	1	+
<i>Spinibdella bifurcata</i> Atyeo	Assiuty, Manfalouty	4	++
Blattisociidae Garman			
<i>Blattisocius dentriticus</i> (Berlese)	Assiuty	1	++
<i>B. keegani</i> Fox	Manfalouty	1	+
<i>Lasioseius africanus</i> Nasr	Hegazy, Mafalouty	2	+
<i>L. parberlesei</i> Bhattacharyya	Manfalouty, Assiuty	2, 1	+
<i>L. youcefi</i> Athias-Henriot	Araby	3	+
Brachychthonidae Polski			
<i>Brachychthonius amicabilis</i> Gil-Martín & Subías	Wordy	1	+
<i>B. pauliani</i> Balogh & Mahunka	Assiuty	1	++
Caligonellidae Grandjean			
<i>Molothrognathus minutus</i> Soliman	Araby	2, 5	+
Camerobiidae Southcott			
<i>Neophyllobius aegyptium</i> Soliman & Zaher	Manfalouty	1	+
<i>N. mangiferus</i> Zaher & Gomaa	Assiuty	1, 2, 5	++
Cheyletidae Leach			
<i>Acaropsella volgini</i> (Gerson)	Araby, Assiuty, Hegazy, Wordy	1	+
<i>Cheletogenes ornatus</i> (Canestrini & Fanzago)	Assiuty, Manfalouty, Wordy	1, 2, 4	+++
<i>Cheletomimus bakeri</i> (Ehara)	Assiuty, Araby, Hegazy, Manfalouty	1, 10	+
<i>C. congensis</i> (Cunliffe)	Assiuty, Araby, Hegazy, Manfalouty	1, 2, 10	+
<i>Cheyletus cacahuamilpensis</i> Baker	Assiuty	1	+
<i>C. malaccensis</i> Oudemans	Manfalouty	2	+
<i>Cunliffella ornata</i> (Wafa & Soliman)	Araby, Nab El-Gamal	1	++
Cunaxidae Thor			
<i>Coleoscius simplex</i> (Ewing)	Assiuty	1, 7	+
<i>Cunaxa capreolus</i> (Berlese)	Assiuty, Manfalouty	1, 4	+
<i>C. setirostris</i> (Hermann)	Manfalouty	1	+
<i>Cunaxoides croceus</i> (Koch)	Manfalouty	2	+
<i>Dactyloscius saopauloensis</i> Den Heyer	Manfalouty	10	+
<i>Neocunaxoides ovatus</i> Lin, Zhang & Ji	Wordy, Manfalouty, Nab El-Gamal	1, 4	++

Table (1). Continue

Mite taxa	Varieties of pomegranate	Locality*	Incidence**
Digamasellidae Evans			
<i>Dendrolaelaps aegypticus</i> Metwally & Mersal, 1978	Araby	1	+
<i>D. zaheri</i> Metwally & Mersal	Manfalouty, Wordy	1, 4	++
Ereynetidae Oudemans			
<i>Ereynetes bolitophilus</i> Fain & Camerik	Assiuty, Wordy	1	+
Erythraeidae Oudemans			
<i>Erythraeus berninensis</i> Haitlinger	Wordy	1	+
Eupalopsellidae Willmann			
<i>Eupalopsellus olearius</i> Zaher & Goma	Manfalouty	4, 6, 8, 11	+
Eupodidae Koch			
<i>Eupodesniloticus</i> Abou-Awad & El-Bagoury	Araby, Manfalouty, Nab El-Gamal	1, 2, 9, 10	+
Galumnidae Jacot			
<i>Pilogalumna ornatura</i> Grandjean	Araby	1	+
Halolaelapidae Karg			
<i>Halolaelaps sexclavatus</i> (Oudemans)	Araby, Manfalouty	1, 2, 8	+
Hemisarcoptidae Oudemans			
<i>Hemisarcoptes malus</i> (Shimer)	Araby	1	+
Histiostomatidae Berlese			
<i>Copronomia mahunkai</i> Eraky	Assiuty, Araby, Wordy, Manfalouty, Nab El-Gamal	1, 3, 8	+++
<i>Histiostoma arcuatus</i> Negm	Araby, Hegazy	1	++
<i>H. camphori</i> Eraky	Hegazy	1	+
<i>H. darwishii</i> Eraky	Assiuty, Araby, Hegazy, Manfalouty	1, 2	+++
<i>H. nasseri</i> Eraky	Assiuty	1	+
<i>H. onioni</i> Eraky & Shoker	Nab El-Gamal	1	+
<i>H. rizkii</i> Eraky	Assiuty, Araby.	1, 2	+
<i>Myianoetus lili</i> Eraky	Manfalouty	1	+
Hypochthoniidae Berlese			
<i>Hypochthonius rufulus</i> (Koch)	Araby, Assiuty	1	+
Iolinidae Pritchard			
<i>Pronematus ubi quitus</i> (McGregor)	Manfalouty	1, 4	++
Laelapidae Berlese			
<i>Androlaelaps aegypticus</i> Hafez, El-Badry & Nasr	Wordy	1	+
<i>A. casalis</i> (Berlese, 1887)	Assiuty	2, 3, 6	+
<i>A. zaheri</i> (Hafez, El-Badry & Nasr)	Wordy	1	+
<i>Cosmolaelaps longus</i> (Hafez, El-Badry & Nasr)	Wordy	2, 4, 5	++
<i>Gaeolaelaps bregetovae</i> (Shereef & Afifi)	Manfalouty	2	++
<i>G. orientalis</i> (Hafez, El-Badry & Nasr)	Araby	2	+
<i>G. queenslandicus</i> (Womersley)	Wordy	4	+
<i>Hypoaspis wohabi</i> Metwally & Ibrahim	Araby, Wordy	1, 2, 3	++
<i>Laelaspis astronomicus</i> (Koch)	Araby	9	++
<i>Ololaelaps bregetovae</i> Shereef & Soliman	Araby, Manfalouty, Nab El-Gamal, Wordy	1, 2	+++
Lohmanniidae Berlese			
<i>Lohmannia aegypticus</i> (El-Badry & Nasr)	Assiuty	1	+++
<i>Papillacarus aciculatus</i> Kunst	Araby	1	+
Macrochelidae Vitzthum			
<i>Macrocheles lagodekshensis</i> Bregetova & Koroleva	Assiuty	1	+
<i>M. merdarius</i> (Berlese)	Assiuty	1	+
<i>M. muscaedomesticae</i> (Scopoli)	Assiuty	1	++
<i>M. perglaber</i> Filipponi & Pegazzano	Wordy	1	+
<i>M. solimani</i> Hafez, El-Badry & Nasr	Assiuty	1, 9	+
<i>M. submotus</i> (= <i>M. congnatus</i>) Falconer	Assiuty	1	+
Melicharidae Hirschmann			
<i>Proctolaelaps aegypticus</i> Nasr	Manfalouty	3, 4	++
<i>P. affii</i> Moraes, Britto, Mineiro & Halliday	Manfalouty	4	+
<i>P. holovertris</i> Moraes, Britto, Mineiro & Halliday	Assiuty	1, 2, 5, 6	+++
<i>P. orientalis</i> Bhattacharyya	Hegazy, Manfalouty	1, 4	+
<i>P. pygmaeus</i> (Mülle)	Araby, Manfalouty, Nab El-Gamal	1, 2, 3, 4	+++
<i>P. scolyti</i> Evans	Araby	1	+

Table (1). Continue

Mite taxa	Varieties of pomegranate	Locality*	Incidence**
Macrochelidae Vitzthum			
<i>Macrocheles lagodekhensis</i> Bregetova & Koroleva	Assiuty	1	+
<i>M. merdarius</i> (Berlese)	Assiuty	1	+
<i>M. muscaedomesticae</i> (Scopoli)	Assiuty	1	++
<i>M. perglaber</i> Filipponi & Pegazzano	Wordy	1	+
<i>M. solimani</i> Hafez, El-Badry & Nasr	Assiuty	1, 9	+
<i>M. submotus</i> (= <i>M. congnatus</i>) Falconer	Assiuty	1	+
Melicharidae Hirschmann			
<i>Proctolaelaps aegyptiacus</i> Nasr	Manfalouty	3, 4	++
<i>P. affiti</i> Moraes, Britto, Mineiro & Halliday	Manfalouty	4	+
<i>P. holovertris</i> Moraes, Britto, Mineiro & Halliday	Assiuty	1, 2, 5, 6	+++
<i>P. orientalis</i> Bhattacharyya	Hegazy, Manfalouty	1, 4	+
<i>P. pygmaeus</i> (Mülle)	Araby, Manfalouty, Nab El-Gamel	1, 2, 3, 4	+++
<i>P. scolyti</i> Evans	Araby	1	+
Microtrombidiidae Thor			
<i>Microtrombidium pusillum</i> (Hermann)	Assiuty	1	++
Nothridae Berlese			
<i>Nothrus anauniensis</i> Canestrini & Fanzago	Assiuty	1	++
Ologamasidae Ryke			
<i>Gamasiphis denticus</i> Hafez & Nasr	Assiuty, Mafalouty	1	+
<i>G. parpulchellus</i> Nasr & Mersal	Assiuty, Manfalouty	2, 6	++
<i>G. pulchellus</i> (Berlese)	Araby	1, 2, 3, 4	+++
Oplitidae Johnston			
<i>Oplitis minutissima</i> (Berlese)	Araby	9	++
Oppiidae Grandjean			
<i>Multioppia wilsoni</i> Akoi	Manfalouty	1, 3, 8, 11	+
<i>Oppia inclinata</i> Hammer	Araby	1	+
Oribatulidae Thor			
<i>Schelorbates zaheri</i> Youssef & Nasr	Manfalouty	6, 9	+
<i>Siculobata sicula</i> (Berlese)	Manfalouty	1, 2	++
<i>Zygoribatula tadrosi</i> (Popp)	Araby	1	+
<i>Z. tameyai</i> El-Badry & Nasr	Manfalouty	1	+
<i>Z. sayedi</i> El-Badry & Nasr	Assiuty	1, 2	++
Pachylaelapidae Berlese			
<i>Pachylaelapsaegyptiacus</i> Hafez & Nasr	Assiuty	9	+
<i>Zygoseius furciger</i> (Berlese)	Assiuty, Manfalouty, Wordy	1, 4, 8, 9	++
Parasitidae Oudemans			
<i>Parasitus badrii</i> Hafez & Nasr	Araby	2	+
<i>P. consanguineus</i> Oudemans & Voigts	Assiuty, Manfalouty	1, 3, 4, 9	+++
<i>P. fimetorum</i> (Berlese)	Assiuty, Araby	1, 2, 3, 9	++
<i>P. hyalinus</i> (Willmann)	Manfalouty	1	+
<i>P. insignis</i> Holzmann	Assiuty	1	+
<i>P. kempersi</i> Oudemans	Assiuty	1	+
<i>P. loricatedus</i> (Wankel)	Manfalouty	1	+
Phytoseiidae Berlese			
<i>Amblyseius swirskii</i> Athias-Henriot	Assiuty, Manfalouty, Wordy	1, 2	++
<i>Cydnoseius negevi</i> (Swirski & Amitai)	Assiuty, Manfalouty	1, 10, 11	+
<i>Euseius scutalis</i> (Athias-Henriot)	Assiuty, Araby, Manfalouty	1, 2, 3, 4, 5,	+++
<i>Neoseiulus barkeri</i> Hughes	Araby, Hegazay, Manfalouty	1, 2, 3, 4, 7	+++
<i>N. mumae</i> (Shehata & Zaher)	Manfalouty	4	+
<i>Proprioseiopsis messor</i> (Wainstein)	Assiuty, Araby, Nab EL-Gamal	1, 2, 6, 8	+
<i>P. ovatus</i> (Garman)	Manfalouty	1, 2, 6, 9	+
<i>Typhlodromus (Typhlodromus) pyri</i> Scheuten	Wordy	1, 2, 3, 6	++
Pygmephoridae Cross			
<i>Bakerdania arvorum</i> (Jacot)	Assiuty	1, 3	+
<i>B. centriger</i> (Cooreman)	Assiuty	4, 6	+
<i>B. exigua</i> (Mahunka)	Araby, Assiuty	3, 4	+
<i>B. montana</i> (Willmann)	Manfalouty	1, 2	+
<i>B. punctata</i> Zaher & Kandeel	Manfalouty	10, 11	++
<i>B. togata</i> (Willmann)	Manfalouty	5, 8, 9	+
<i>Pediculaster arabicus</i> Zaher & Kandeel	Manfalouty	1, 7	++

Table (1). Continue

<i>Mite taxa</i>	Varieties of pomegranate	Locality*	Incidence**
Pygmephoridae Cross			
<i>P. demeterorum</i> Mahunka	Araby	3, 9	+
<i>P. endroedyi</i> (Mahunka)	Assiuty	11	+
<i>P. ignotus</i> Krczal	Manfalouty	10	+
<i>Pygmephorus stammeri</i> Krczal	Manfalouty	8	+
Scheloribatidae Jacot			
<i>Scheloribatespraeincisus</i> (Berlese)	Manfalouty	1	+
Scutacaridae Oudemans			
<i>Imparipes vulgaris</i> Delfinado & Baker	Manfalouty, Assiuty	8	+
<i>Scutacarus deficiens</i> Mahunka	Assiuty	2	++
Sejidae Berlese			
<i>Sejus americanus</i> (Banks)	Araby, Assiuty, NabEl-Gamel	1, 3	+
Stigmaeidae Oudemans			
<i>Agistemus exsertus</i> Gonzalez	Assiuty, Manfalouty, Wordy, Araby	1, 11	+++
<i>A.vulgaris</i> Soliman & Gomaa	Hegazy	2	+
Tarsonemidae Kramer			
<i>Polyphagotarsonemus latus</i> ¹ (Banks)	Assiuty, Manfalouty	1, 2, 10	++
<i>Tarsonemus bilobatus</i> Suski	Manfalouty	1	++
<i>T. buxi</i> (Canestrini & Berlese)	Manfalouty	4	+
<i>T. fennicus</i> Oudemans	Assiuty	7	+
<i>T. lobosus</i> Suski	Assiuty	9	+
<i>T. myceliophagus</i> Hussey	Manfalouty, Assiuty	1, 2, 3	++
<i>T. noxius</i> (Humiczewska)	Manfalouty	7	+
<i>T. schaarschmidti</i> Mahunka	Wordy	1	+
<i>T. setifer</i> Ewing	Araby	1	+
<i>T. stammeri</i> Schaarschmidt	Assiuty	4	+
<i>T. subcorticalis</i> Lindquist	Araby, Assiuty	1, 2	+
<i>T. talpae</i> Schaarschmidt	Manfalouty	8	+
<i>T. virgineus</i> Suski	Assiuty	2	+
Tenuipalpidae Berlese			
<i>Brevipalpus phoenicis</i> (Geijskes)	Assiuty, Manfalouty	1, 2, 3, 8	+
<i>Cenopalpus lanceolatisetae</i> Attiah	Assiuty	10	+
<i>C. pulcher</i> (Canestrini & Fanzago)	Manfalouty	2	+
<i>Phyllozetanypus aegyptiacus</i> Sayed	Assiuty	1, 10	+(accidentally).
<i>Raoiella indica</i> Hirst	Assiuty	1, 10	+(accidentally).
<i>Tenuipalpus eriophyoides</i> Baker	Manfalouty	1	+
<i>T. granati</i> Sayed	Manfalouty	2	+
<i>T. punicae</i> Pritchard & Baker	Assiuty, Manfalouty, Wordy	1, 2, 3, 4, 5, 6, 7, 8, 10, 11	+++ (cosmopolitan).
Tetranychidae Donnadieu			
<i>Eutetranychus orientalis</i> (Klein)	Assiuty	1, 7	+
<i>E. palmatus</i> Attiah	Assiuty, Manfalouty	1, 7	+(accidentally).
<i>Oligonychusafrasiaticus</i> (McGregor)	Manfalouty	2	+(accidentally).
<i>O. mangiferus</i> (Rahman & Sapra)	Assiuty, Manfalouty, Wordy	1, 3, 8	+++
<i>O. punicae</i> ¹ (Hirst)	Assiuty	1, 3	++
<i>Tetranychus urticae</i> Koch	Assiuty, Manfalouty, Hegazy, Wardy, Al-Taify	1, 2, 5	++
Trombiculidae Ewing			
<i>Trombicula autumnalis</i> (Shaw)	Manfalouty	4	+
Trombidiidae Leach			
<i>Dolichothonribium anatoliae</i> Mokol & Sevsay	Manfalouty	5	+
<i>Trombidium holosericeum</i> (Linnaeus)	Assiuty	1, 6	+
Tydeidae Kramer			
<i>Tydeus californicus</i> (Banks)	Nab El-Gamal, Wordy	4	+
<i>T. kochi</i> (Oudemans)	Araby, Manfalouty	1	+
Uropodidae Kramer			
<i>Urodiaspis aegypticus</i> Ahmed	Assiuty, Manfalouty	1, 4, 5, 7, 9	+++
<i>Uroobovella ibiolis</i> Vitzthum	Manfalouty	1	+
<i>U. krantzi</i> (Zaher & Afifi)	Manfalouty, Wordy	1, 2	+++
<i>U. marginata</i> (Koch)	Assiuty	1	+
<i>Uropoda orbicularis</i> (Müller)	Assiuty	1, 2	++

Table (1). Continue

Mite taxa	Varieties of pomegranate	Locality*	Incidence**
Veigaiidae Oudemans			
<i>Cyrtodrolaelaps hirta</i> Berlese	Assiuty	1	+
<i>Veigaia propinqua</i> Willmann	Assiuty	1	+
Trombiculidae Ewing			
<i>Trombicula autumnalis</i> (Shaw)	Manfalouty	4	+
Trombidiidae Leach			
<i>Dolichothrombium anatoliae</i> Mąkol & Sevsay	Manfalouty	5	+
<i>Trombidium holosericeum</i> (Linnaeus)	Assiuty	1, 6	+
Tydeidae Kramer			
<i>Tydeus californicus</i> (Banks)	Nab El-Gamal, Wordy	4	+
<i>T. kochi</i> (Oudemans)	Araby, Manfalouty	1	+
Uropodidae Kramer			
<i>Urodiaspis aegypticus</i> Ahmed	Assiuty, Manfalouty	1, 4, 5, 7, 9	+++
<i>Uroobovella ibiolis</i> Vitzthum	Manfalouty	1	+
<i>U. krantzi</i> (Zaher & Afifi)	Manfalouty, Wordy	1, 2	+++
<i>U. marginata</i> (Koch)	Assiuty	1	+
<i>Uropoda orbicularis</i> (Müller)	Assiuty	1, 2	++
Veigaiidae Oudemans			
<i>Cyrtodrolaelaps hirta</i> Berlese	Assiuty	1	+
<i>Veigaia propinqua</i> Willmann	Assiuty	1	+

In general, the current survey of mite species on pomegranate trees in Upper Egypt revealed the diversity of mite fauna (Phytophagous and predacious), which gives a balance between the population of each group of mites with noticeable increase in the number of predatory species, this may be due to the extensive use of pesticides to control both phytophagous mite and insect species hoping to obtain pesticide resistant strain of predatory mites.

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