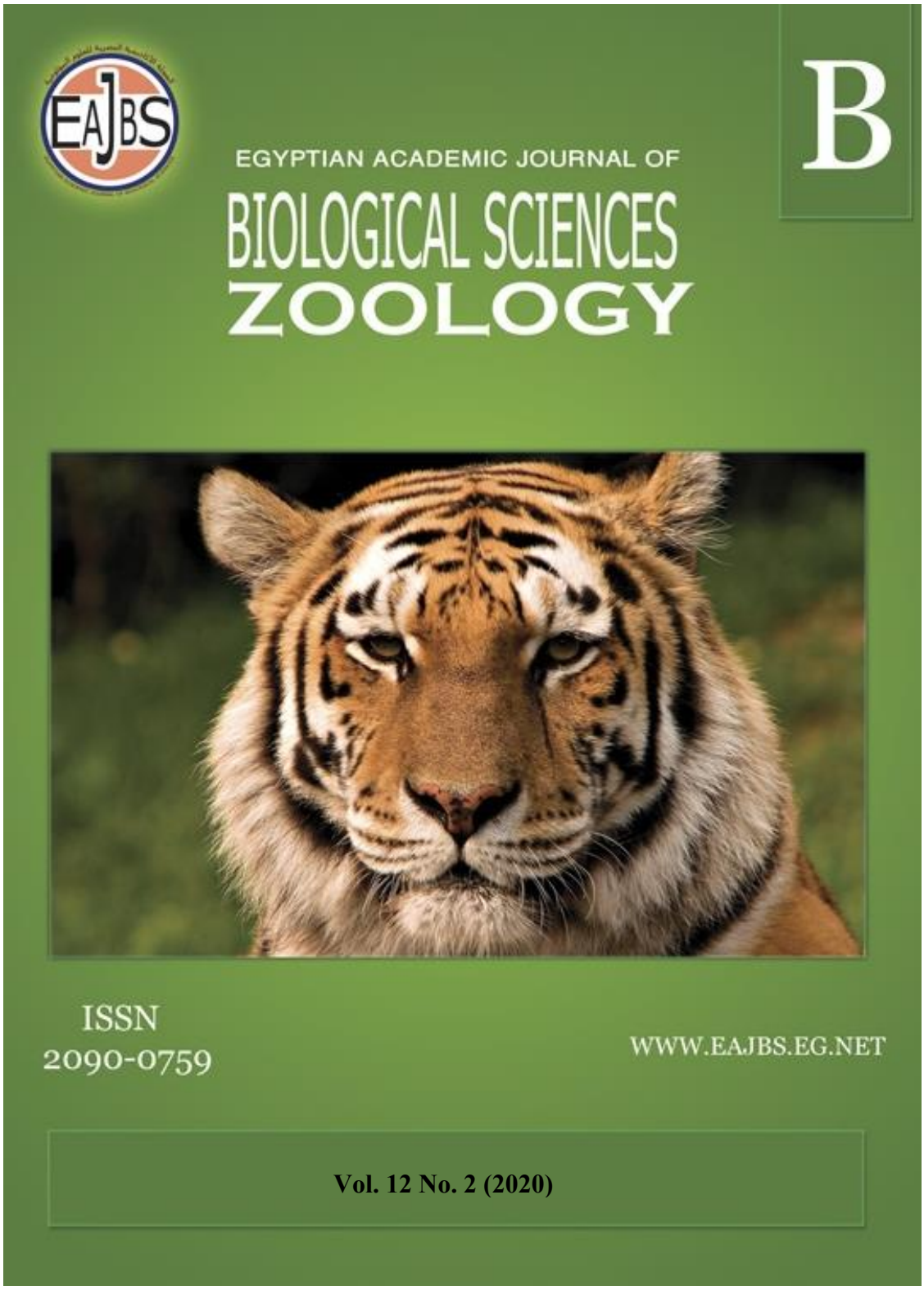


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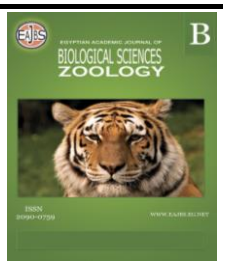
**Citation**: *Egypt. Acad. J. Biolog. Sci. (B. Zoology) Vol. 12(2) pp: 25-35(2020)*

**Egypt. Acad. J. Biolog. Sci., 12(2):25-35 (2020)**

**Egyptian Academic Journal of Biological Sciences**
**B. Zoology**
**ISSN: 2090 – 0759**
**http://eajbsz.journals.ekb.eg/**




# Mites Inhabiting Manure and Dunghills in Assiut Governorate, with Annotated Checklist of Mite Species Existing in Husbandry Farms in Egypt

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**ARTICLE INFO**
**Article History**
Received:4/6/2020
Accepted:25/8/2020
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***Keywords***:
Mites, Survey, Manures, Assiut, Checklist

**ABSTRACT**

The present survey of mite species inhabiting organic manure in different animal-sheds (i.e., buffalo, cow, sheep, goats), in both farms, the experimental farm of the Faculty of Agriculture, Assiut University and the production farm of El-Fateh district, Data showed that there were 28 mite species pertaining to 20 genera of 12 families in three mite orders (Mesostigmata, Astigmata, Trombidiformes). Mesostigmata represented by 19 species (8 families); Astigmata (Acaridiidia), represented by 8 species (2 families) and Trombidiformes represented by two species belonging to two families. Both mite species of the families Macrochelidae Vithzthum, 1930, and Parasitidae Oudemans, 1901 were recorded in high densities. While scarce numbers of Tarsonemidae Canestrini & Fanzago, 1876 were observed. The annotated checklist reported 150 mite species belonging to 67 genera of 26 families.

## INTRODUCTION

Mites play an important role in the biochemical cycle of nature, as well as in the agricultural cycles of organic matters. They are considered to be very important in both human and animal caterings. From this standpoint, attention needs to be paid to mite species existing organic matter which represents various species (Lindquist *et al.*, 2009; Arjomandi *et al.*, 2013). Mites were classified based on different feeding habitats as predators and parasites in addition to free-living ones. In Egypt survey studies on mite species inhabiting organic manure have been received the attention of many authors, such as Mohamed, 1963; Sherref *et al.*, 1980; Zaher *et al.*, 1980; Shoker and Eraky (1994); Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007; Desoky *et al.*, 2020. The accumulated knowledge of mite fauna existing in organic manure is extremely poor as compared with other habitats (i.e., soil, plants, and stored products). Therefore, the aims of the current study are to shed light on mite species existing in animal sheds in Assiut Governorate, to compare those species with others, which identified from different farms throughout Egypt and to know the most important predatory species for subsequent studies.

## MATERIALS AND METHODS

The study was carried out in the Experimental Farm of the Faculty of Agriculture,

Assiut University, and the production farm of El-Fateh district (15 km east of Assiut city). Samples were collected fortnightly for one year starting in November 2018. Each sample of 500 g from dunghills ( n=10) was taken from both farms. Samples were placed in plastic bags, were closed well, and were transferred into a laboratory for extraction of mite individuals using Berlese's extractor apparatus. Mites were received in ethyl alcohol (70%); were cleared up in lactic acid, then were mounted in Hoyer's medium. Mites were identified using the illustrated keys of Scheucher (1957); Atyeo (1960); Krantz (1978); O'Connor (1982); Zaher (1984a,b; 1986); Meyer and Ueckermann (1987); Evans (1992); Otto (1999); O'Connor (2001); Fain et al. (2002); Ueckermann and Grout (2007); Eraky and Osman (2008a); Eraky et al. (2010); Omukunda et al. (2012); Abo-Shnaf and Moraes (2014); Negm and Mesbah (2014); Skvarla et al. (2014); Eghbalian et al. (2016). The voucher mounted slides of mite species surveyed in the current study were deposited in the Acari collection of Plant Protection Department, Faculty of Agriculture, Assiut University, Egypt (FAAU).

## RESULTS AND DISCUSSION

Results in (Table 1). Showed the presence of approximately 150 species pertaining to 67 genera of 26 families, accompanying animal farms throughout Egypt. Most of surveyed mite species were recorded from husbandry farms by certain authors: Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007 (Assiut Governorate) and Abdel-Aziz, 1999; Desoky *et al.,* 2020 (Sohag Governorate). The present study recorded 24 species belonging to 17 genera of 12 families within 3 orders. The Astigmata (Acaridiidia) was represented by 4 species (2 families); Mesostigmata by represented 19 species (8 families) and Trombidiformes represented by two species (2 families), extracted from manure and dung-hills at Assiut Governorate. While, at the same farm of the present study (Assiut University farm), Shoker and Eraky, 1994, surveyed 28 species of the Mesostigmata (18 genera and 9 families), and Negm, 2007 recorded 47 mite species of different groups on the other side, Abdel-Aziz, 1999 found 35 species from an animal farm (Sohag Governorate) and Desoky *et al.,* 2020 recorded only 6 mite species from a newly established animal farm (Sohag Governorate). The following species of mites have been reported in the current study and in the studies of both Shoker and Eraky, 1994 and Negm, 2007, these species were: *Halolaelaps sexclavatus* (Oudemans, 1902); *Macrocheles merdarius* (Berlese, 1889) and *Macrocheles muscadomesticae* (Scopoli, 1772). While the rest species extracted from the same animal farm (Assiut University) were disappeared and other species appeared, this may be as a result of weather differences and the competition between species. Finally, attention must be paid to study predatory mite species belonging to the families: Laelapidae, Phytoseiidae, Ascidae, Parasitidae, Uropodidae, Macrochelidae, Stigmaeidae, Ameroseiidae and Tarsonemidae (Table 1), where it is necessary to study their efficiencies in reducing the numbers of phytophagous mites, it can be considered as one of the natural control agents.

**Table 1:** Checklist of mite species recorded from an animal farm in the present study and previous literature.

| Order/family/species | Habitat | Location | Reference |
|---|---|---|---|
| **MESOSTIGMATA** | | | |
| **Ameroseiidae Evans, 1963** | | | |
| *Kleemania plumosus* (Oudemans, 1902) | Animal farm, Animal sheds. | Assiut, Sohag (Upper Egypt), Ismailia. | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007; El-Sharabasy et al., 2014, 2015). |
| **Ascidae Voigts & Oudemans, 1905** | | | |
| *Gamasellodes bicolor* (Berlese, | Animal farm | Assiut | (Present study). |

| | | | |
|---|---|---|---|
| *G. zaheri* Nasr, 1986 | Animal farm | Assiut | (Present study). |
| *Protogamasellus denticus* Nasr, 1978 | Animal farm | Assiut, Ismailia. | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007; El-Sharabasy et al., 2015). |
| **Blattisociidae Garman, 1948** | | | |
| *Lasioseius thermophlus* (Willmans, 1942) | Animal farm | Assiut | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007). |
| *L. zaheri* Nasr, 1987 | Animal manure | Giza, Sohag (Upper Egyypt), | (Zaher, 1986; El-Sharabasy et al., 2015). |
| *L. aegypticus* Afifi, 1982 | Animal sheds, Organic manure | Giza, Ismailia. | (Zaher, 1986; El-Sharabasy et al., 2014, 2015). |
| *Blattisocius dentriticus* (Berlese, | Animal manures | Ismailia. | (El-Sharabasy et al., 2015). |
| **Deramanyssidae Kolenati, 1859** | | | |
| *Dermanyssus gallina* (De Gee, | Animal sheds | Ismailia. | (El-Sharabasy et al., 2014). |
| **Digamasellidae Evans, 1957** | | | |
| *Digamasellus presepum* Berlese, 1918 | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *Dendrolaelaps rasmi* Nasr & Mersal, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *D. zaheri* Metwally & Mersal, 1985 | Animal farm | Assiut, Ismailia. | (El-Sharabasy et al., 2015; Present study). |
| *Dendrolaelaps* sp. | Animal farm | Assiut | (Present study). |
| **Halolaepidae Berlese, 1892** | | | |
| *Halolaelaps sexclavatus* (Oudemans, 1902) | Animal farm | Assiut | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007, Present study). |
| **Laelapidae Berlese, 1892** | | | |
| *Androlaelaps casalis* (Berlese, 1887) | Animal farm, Organic manure, Animal sheds. | Assiut, Sohag, El-Monofeia, Demiatta, Ismailia. | (Zaher, 1986; Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007; El-Sharabasy et al., 2014, |
| *A. aegypticus* Hafez, El-Badry & Nasr, 1982 | Organic manure | Giza | (Zaher, 1986). |
| *A. zaheri* Hafez, El-Badry & Nasr, 1982 | Organic manure | Giza | (Zaher, 1986). |
| *A. fahrenholzi* (Berlese, 1911) | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007; Abdelgayed, 2017). |
| *Ololaelaps bregetovae* Shereef & Soliman, 1980 | Organic manure | Assiut | (Abdelgayed, 2017). |
| *Hypoaspis astronomicus* (Koch, 1839) | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *H. arabicus* Hafez, El-Badry & Nasr, 1982 | Organic manure | Giza | (Zaher, 1986). |
| *H. miles* (Berlese, 1892) | Animal farm | Assiut, Sohag | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007). |
| *H. bregetovae* Shereef & Afifi, 1980 | Organic manure | Giza | (Zaher, 1986). |
| *H. vacua* (Michael, 1891) | Animal farm | Assiut | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007). |
| *H. zachvatkinae* Shereef & Afifi, 1980 | Organic cattle manure | Giza | (Zaher, 1986). |
| *H. baloghi* Shereef & Afifi, 1980 | Organic cattle manure | Giza, Ismailia. | (Zaher, 1986; El-Sharabasy et al., 2015). |
| *H. pertrovae* Shereef & Afifi, 1980 | Organic cattle manure | Al-Exandria (Lower Egypt). | (Zaher, 1986). |
| *Laelaspis astronomicus* (Koch, | Organic manure | Giza, Demiatta, | (Zaher, 1986; El-Sharabasy et |

| | | | |
|---|---|---|---|
| 1839) | | El-Dakahleia (Lower Egypt), Ismailia. | al., 2015). |
| *L. volgini* Shereef & Afifi, 1980 | Organic cattle manure | Giza | (Zaher, 1986). |
| **Macrochelidae Vitzthum, 1930** | | | |
| *Macrocheles lagodekhensis* Bregetova & Koroleva, 1960 | Animal farm | Assiut | (Present study). |
| *M. submotus* Falconer, 1924 | Animal farm | Assiut | (Present study). |
| *M. perglaber* Filipponi & Pegazzano, 1962 | Animal farm | Assiut | (Present study). |
| *M. krantzi* Evans & Hyatt, 1963 | Animal farm | Assiut | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Negm, 2007). |
| *M. merdarius* (Berelese, 1889) | Animal farm, Animal sheds. | Sohag, Ismailia. | (Shoker and Eraky, 1994; El-Sharabasy et al., 2014, 2015; Desoky et al., 2020; Present study). |
| *M. muscadomesticae* (Scopoli, 1772) | Animal farm, Animal sheds. | Sohag, Ismailia. | (Shoker and Eraky, 1994; Abdel-Aziz, 1999; Negm, 2007; El-Sharabasy et al., 2014, 2015; Present study). |
| *M. solimani* Hafez, El-Badry & Nasr, 1985 | Animal farm | Sohag | (Desoky et al., 2020). |
| *M. shereefi* Hafez, El-Badry & Nasr, 1985 | Organic manure | El-Ismaelia (Canal zone), | (Zaher, 1986). |
| *M. robustus* (Berlese, 1904) | Animal farm | Assiut | (Shoker and Eraky, 1994). |
| *M. glaber* (Müller, 1860) | Organic manure | Ismailia, All over the country. | (Zaher, 1986; El-Sharabasy et al., 2015). |
| *M. matrius* (Hull, 1925) | Organic manure | All over the country | (Zaher, 1986). |
| *M. sembelawanii* Hafez, El-Badry & Nasr, 1985 | Organic manure | El-Dakahleia, El-Beheira, Kafr El-Skeikh (Lower Egypt). | (Zaher, 1986). |
| *M. africanus* Hafez, El-Badry & Nasr, 1985 | Organic manure | Giza | (Zaher, 1986). |
| *Macrocheles* sp. | Animal farm | Assiut | (Shoker and Eraky, 1994; |
| **Pachylaelapidae Vitzthum, 1931** | | | |
| *Zygoseius furciger* Berlese, 1916 | Organic manure | Assiut | (Abdelgayed, 2017). |
| **Parasitidae Oudemans, 1901** | | | |
| *Parasitus fimetorum* (Berlese, 1904) | Animal farm | Asssiut | (Present study). |
| *P. consanguineous* Oudemans & Voigts, 1904 | Animal farm | Assiut | (Present study). |
| *P. kempersi* Oudemans, 1902 | Animal farm | Assiut | (Present study). |
| *P. mustelarum* Oudemans, 1902 | Animal farm | Assiut | (Present study). |
| *P. loricatus* (Wankel, 1861) | Animal farm | Assiut | (Present study). |
| *P. hyalinus* (Willman, 1949) | Animal farm | Assiut | (Present study). |
| *P. insignis* (Holzmann, 1969) | Animal farm | Assiut | (Present study). |
| *P. beta* Oudemans & Voigts, 1904 | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *P. lunaris* (Berlese, 1882) | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *P. mammilatus* (Berlese, 1905) | Animal farm | Assiut, Sohag | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, |
| *P. numerous* Karg, 1965 | Animal farm | Assiut | (Shoker and Eraky, 1994; |
| *P. badrii* Hafez & Nasr, 1986 | Animal sheds, Organic manure | El-Beherira, Giza, El Gharbeia, | (Zaher, 1986; El-Sharabasy et al., 2014, 2015). |

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|---|---|---|---|
| *P. burchanensis* Oudemans, 1903 | Organic manure | El-Gharbeia, El-Monofeia (Lower Egypt), Giza, Benisuef (Upper Egypt). | (Zaher, 1986). |
| *Parasitus* sp. | Animal farm | Assiut | (Present study). |
| *Pergamasus misellus* Berlese, 1904 | Animal farm | Assiut, Sohag | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007). |
| **Phytoseiidae Berlese, 1914** | | | |
| *Amblyseius moir* (Karg, 1970) | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *Typhlodromus zaheri* El-Badry, 1967 | Animal sheds, Animal manures. | Ismailia | (El-Sharabasy et al., 2014, 2015). |
| **Rhodacaridae Oudemans, 1902** | | | |
| *Rhodacarillus* sp. | Animal farm | Assiut | (Present study). |
| *Rhodacarus roseus* Oudemans, | Animal manures | Ismailia. | (El-Sharabasy et al., 2015). |
| **Uropodidae Kramer, 1881** | | | |
| *Fuscuropoda marginata* (Koch, 1839) | Animal farm | Assiut | (Shoker and Eraky, 1994; Negm, 2007). |
| *Leiodynychus krameri* (Canestrini, 1882) | Animal farm | Assiut, Sohag | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; (Abdel-Aziz, 1999; Negm, 2007). |
| *Trichouropoda krantzi* Hirschumann, 1961 | Animal farm | Assiut, Sohag | (Shoker and Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007). |
| *T. patavina* (Canestrini, 1977) | Organic manure | Giza | (Zaher, 1986). |
| *Urodinychus pilosus* Ahmed, 1934 | Animal farm | Assiut, Giza | (Zaher, 1986; Shoker and Eraky, 1994; Negm, 2007). |
| *Uropodiaspis aegyptiacus* Ahmed, 1984 | Animal farm | Sohag | (Desoky et al., 2020). |
| *U. walker* Berlese, 1851 | Animal farm | Assiut | (Present study). |
| *Urodiaspis* sp. | Animal farm | Asssiut | (Present study). |
| *U. marginata* (Koch, 1836) | Animal farm | Assiut | (Present study). |
| *U. ibiolis* Vitzthum, 1905 | Animal farm | Assiut | (Present study). |
| *Uroobovella krantzi* Zaher & | Organic manure | Giza | (Zaher, 1986). |
| *Uroobovella* sp. | Animal farm | Assiut | (Presnt study). |
| *Uropoda* sp. | Animal farm | Assiut | (Shoker and Eraky, 1994; |
| *Chiropturopoda bakeri* Zaher & Afifi, 1986 | Organic manure | Giza, Benisuef (Upper Egypt). | (Zaher, 1986). |
| **Vigaidae Oudemans, 1901** | | | |
| *Vigaia propnquea* Oudemans, 1928 | Animal farm | Assiut | (Presnt study). |
| *Cyrthydrolaps hirtus* Berlese, 1914 | Animal farm | Assiut | (Presnt study). |
| **Astigmata (Acaridida)** | | | |
| **Acaridae Ewing & Nesbitt, 1942** | | | |
| *Acotyledon khalifai* Eraky et al. 2000 | Manure of animals | Sohag | (Eraky et al. 2000; Negm, 2007). |
| *A. manuri* Eraky, 1999a | Manure of animals | Assiut | (Eraky, 1999a; Negm, 2007; Presnt study). |
| *A. nerminka* Eraky, 1999a | Manure of animals | Assiut | (Eraky, 1999a; Negm, 2007). |
| *A. thernyshevi* (Zakhvatkin, 1941) | Animal-sheds, Animal farm | Assiut, Sohag | (Eraky and Nasser, 1993; Abo-Elmaged, 1998; Abdel-Aziz, 1999). |
| *A. krameri* (Berlese, 1892) | Animal farm | Assiut, Sohag | (Abo-Elmaged, 1998; Abdel- |

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|---|---|---|---|
| | | | Aziz,1999). |
| *Cosmoglyphus rizkii* Eraky et al. 2000 | Manure of animals | Assiut | (Eraky et al. 2000; Negm, 2007). |
| *C. manuri* Negm, 2007 | Manure of animals | Assiut | (Negm, 2007; Present study). |
| *C. barbisetus* Eraky, 1999d | Animal farm | Assiut | (Eraky, 1999d; Negm, 2007). |
| *Caloglyphus arafati* Eraky, 2000a | Manure of animals | Assiut | (Eraky, 2000a; Negm, 2007). |
| *C. berlesei* (Oudemans, 1902) | Animal farm | Assiut | (Abo-Elmaged, 1998). |
| *C. oudemans* Zakhatkin, 1937 | Animal farm | Assiut | (Eraky and Nasser, 1993). |
| *C. csibbii* Eraky, 1999c | Animal farm | Assiut | (Eraky, 1999c Negm, 2007). |
| *C. labiduratus* Negm, 2007 | Animal farm | Assiut | (Negm, 2007). |
| *Forcellinia mahunkai* Eraky, 1999b | Manure of animals | Sohag | (Eraky, 1999b; Negm, 2007). |
| *Calvolia solimani* Eraky, 1999b | Animal farm | Assiut | (Eraky, 1999b; Negm, 2007). |
| *C. zaheri* Eraky, 1998 | Animal farm | Assiut | (Eraky, 1998; Negm, 2007; Present study). |
| *C. mahunkai* Negm, 2007 | Manure of animals | Assiut | (Negm, 2007; Present study). |
| *C. heterocoma* (Michael, 1903) | Animal farm | Assiut, Sohag | (Eraky and Nasser, 1993; Abo-Elmaged, 1998; Abdel-Aziz, 1999). |
| *Acarus clavatus* Negm, 2007 | Manure of animals | Assiut | (Negm, 2007; Present study). |
| *Tyroglyphus putrescentiae* (Shrank, 1781) | Animal sheds, Animal farm. | Assiut, Sohag, Ismailia. | (Eraky and Nasser, 1993; Abdel-Sater et al. 1995; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Abdel-Sater and Eraky, 2002; El-Sharabasy et al., 2014, 2015). |
| *Rhizoglyphus robini* Claparede, 1869 | Animal farm | Assiut | (Abdel-Sater et al. 1995; Abdel-Sater and Eraky, 2002). |
| **Histiostomatidae Berlese, 1897** | | | |
| *Copronomia mahunkai* Eraky, 1999c | Animal farm | Assiut | (Eraky, 1999c; Negm, 2007; Present study). |
| *C. sphaerocerae* (Vitzthum, 1922) | Animal farm | Assiut, Sohag | (Eraky and Nasser, 1993; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007). |
| *Glyphanoetus mahunkai* Eraky, 1994 | Animal farm | Assiut, Sohag | (Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007). |
| *G. omari* Eraky et al. 2000 | manure of animals | Sohag | (Eraky et al., 2000; Negm, 2007). |
| *G. processum* Eraky, 1994 | Animal farm | Assiut | (Eraky, 1994). |
| *Histiostoma alii* Eraky, 2000b | manure of animals | Sohag | (Eraky, 2000b; Negm, 2007). |
| *H. farghali* Eraky, 2000b | manure of animals | Sohag | (Eraky, 2000b; Negm, 2007). |
| *H. manuri* Eraky, 2000b | manure of animals | Sohag | (Eraky, 2000b; Negm, 2007). |
| *H. tinydorsalis* Eraky, 1999a | manure of animals | Assiut | (Eraky, 1999a; Negm, 2007). |
| *H. negmi* Eraky, 2000b | Manure of animals | Sohag | (Eraky, 2000b; Negm, 2007). |
| *H. essami* Eraky et al. 2000 | manure of animals | Sohag | (Eraky et al. 2000). |
| *H. pickaxei* Eraky & Shoker, 1993b | Animal-sheds, Skin of dead animals | Assiut, El-Minia | (Eraky and Shoker, 1993b; Abdel-Aziz, 1999; Negm, 2007). |
| *H. arcuatus* Negm, 2007 | Animal farm | Sohag | (Desoky et al., 2020). |
| *H. camphori* Eraky, 1999d | Animal farm | Assiut | Eraky, 1999d; Negm, 2007; |
| *H. darwishii* Eraky, 1994 | Animal farm | Assiut, Sohag | Eraky, 1994; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007; Present study). |
| *H. onioni* Eraky & Shoker, 1994 | Animal-sheds | Sohag | (Abdel-Aziz, 1999). |
| *H. rizkii* Eraky, 1994 | Animal-sheds | Sohag | (Abdel-Aziz, 1999). |

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|---|---|---|---|
| *H. sarrai* Eraky & Shoker, 1994 | Animal-sheds | Sohag | (Abdel-Aziz, 1999). |
| *H. nasseri* Eraky, 1994 | Animal-sheds | Sohag | (Abdel-Aziz, 1999). |
| *H. sammari* Eraky, 1999d | Animal farm | Assiut | (Eraky, 1999d; Negm, 2007). |
| *H. zaheri* Eraky, 1997 | Manure of animals | Assiut | (Eraky, 1997; Negm, 2007). |
| *H. solimani* Eraky, 1997 | Manure of animals | Assiut | (Eraky, 1997; Negm, 2007). |
| *Hormosianoetus mahunkai* Eraky & Shoker, 1993a | Animal farm | Sohag | (Eraky and Shoker, 1993a; Desoky et al., 2020). |
| *Myianoetus lili* Eraky, 1993 | Animal farm | Assiut, Sohag | (Eraky and Nasser, 1993; Eraky, 1993; Abo-Elmaged, 1998; Abdel-Aziz, 1999; Negm, 2007; Present study). |
| **Glycyphagidae Berlese, 1887** | | | |
| *Glycyphagus domesticus* (de Geer, 1778) | Animal manures | Ismailia | (El-Sharabasy et al., 2015). |
| **TROMBIDIFORMES** | | | |
| **Bdellidae Dugès, 1834** | | | |
| *Cyta laterostris* (Hermann, 1804) | Animal sheds, Animal manures | Ismailia | (El-Sharabasy et al., 2014, 2015). |
| *Spinibdella birfurcata* Atyeo, 1960 | Animal manures | Ismailia | (El-Sharabasy et al., 2015). |
| **Caligonellidae Grandjean, 1944** | | | |
| *Caligonella humilis* Grandjean, 1838 | Organic manure | El-Dakahleia (Lower Egypt). | (Zaher, 1986). |
| *Neognathus oteifi* Soliman & Gomaa, 1986 | Organic manure | Giza | (Zaher, 1986). |
| **Cheyletidae Leach, 1815** | | | |
| *Acaropsella notchi* Gomaa & Hassan, 1986 | Organic manure | Giza, El-Beherira, El-Monofeia, Assiut, Tahreer province. | (Zaher, 1986). |
| *Cheletomorpha lepidopterorum* (Shaw, 1794) | Organic manure | Several localities of Egypt. | (Zaher, 1986). |
| *Cheyletus badryi* Zaher & Hassan, 1986 | Organic manure | Giza, Tahreer province, El-Qualyobia, El-Monofeia, Assiut, El-Sharkeia, Ismailia. | (Zaher, 1986; El-Sharabasy et al., 2015). |
| *C. cacahuamilpensis* Baker, 1949 | Organic manure | El-Monofeia, Al-Exandria, Kafr El-Sheikh. | (Zaher, 1986). |
| *C. eruditus* (Schrank, 1781) | Animal sheds, Organic manure | Giza, Ismailia. | (Zaher, 1986; El-Sharabasy et al., 2014, 2015). |
| *C. malaccensis* Oudemans, 1930 | Animal sheds, Organic manure. | Giza, Ismailia | (Zaher, 1986; El-Sharabasy et al., 2014, 2015). |
| *Hemicheyletia bakeri* (Ehara, 1962) | Animal sheds, Animal manures | Ismailia | (El-Sharabasy et al., 2014, 2015). |
| *H. congensis* (Cunliffe, 1962) | Organic manure | Giza, El-Fayoum, El-Monofia, Tahreer province. | (Zaher, 1986). |
| *Lepidocheyla solimani* Zaher & Hassan, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *Grallacheles baker* De Leon, 1962 | Organic manure | Giza, Kafr El-Sheikha. | (Zaher, 1986). |
| *Ker bakeri* Zaher & Soliman, 1967 | Organic manure | Giza | (Zaher, 1986). |
| *K. summersi* Gomaa & Hassan, 1986 | Organic manure | El-Monofeia | (Zaher, 1986) |

| | | | |
|---|---|---|---|
| *Neoeucheyla ornate* Wafa & Soliman, 1968 | Organic manure | Giza, Beisuef | (Zaher, 1986). |
| **Microtrombidiidae Thor, 1935** | | | |
| *Microtrombidium* sp. | Animal farm | Assiut | (Present study). |
| **Pygmephoridae Cross, 1969** | | | |
| *Trochometridium aegypticus* Yousef & Kandeel, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *Pediculaster arabicus* Zaher & Kandeel, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *Moseriella africanus* Zaher & Kandeel, 1986 | Organic manure | Assiut | (Zaher, 1986). |
| **Raphignathidae Kramer, 1877** | | | |
| *Raphignathus bakeri* Zaher & Gomaa, 1979 | Animal manures | Ismailia | (El-Sharabasy et al., 2015). |
| **Stigmaeidae Oudemans, 1931** | | | |
| *Apostigmaeus navicella* Grandjean, 1944 | Organic manure | Giza | (Zaher, 1986). |
| *Apostigmaeus aegyticus* Soliman & Gomaa, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *Stigmaeus banksi* Gomaa & Hassan, 1986 | Organic manure | Giza, El-Qualyabia (Lower Egypt). | (Zaher, 1986). |
| *S. triramus* Soliman & Gomaa, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *S. africanus* Soliman & Gomaa, 1986 | Organic manure | Ismailia, El-Dakahleia, El-Gharbeia (Lower Egypt). | (Zaher, 1986; El-Sharabasy et al., 2015). |
| **Siteroptidae Mahunka, 1970** | | | |
| *Siteroptes serratesetae* Soliman & Kandeel, 1986 | Organic manure | El-Sharkia (Lower Egypt). | (Zaher, 1986). |
| *S. posterotrunctata* Yousef & Kandeel, 1986 | Organic manure | Giza | (Zaher, 1986). |
| *S. manurei* Soliman & Kandeel, 1986 | Animal farm | Sohag | (Desoky et al., 2020). |
| **Tarsonemidae Canestrini & Fanzago, 1876** | | | |
| *Tarsonemus bilobatus* Suski, 1965 | Animal farm | Assiut | (Present study). |

**Acknowledgment**

Authors are grateful to Prof. Dr. A.M. Metwally (Al-Azhar University) and Prof Dr. M.M. Kandeel (Zagazig University), for identifying some mite species of the current study and A. S. Abdelgayed (M.Sc., Plant Protection), for his kind, helps and for providing references used in the study.

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