

## Survey of Mite Species Inhabiting Animal Production Farm at Sohag Governorate, with Checklist of Mites Existing Manure and Dung Hills in Egypt

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### ABSTRACT

The present study was carried out in the newly established animal production farm of the Faculty of Agriculture, Sohag University, in order to survey the mite species inhabiting manure and dung hills. The study showed the occurrence of six species of mites (i.e., *Macrocheles solimani* Hafez, El-Badry & Nasr, 1985; *Macrocheles merdarius* (Berlese, 1889); *Uropodiaspis aegyptiacus* Ahmed, 1984; *Siteroptes manure* Soliman & Kandeel, 1986; *Histiostoma arcuatus* Negm, 2007 and *Hormosianoetus mahunkai* Eraky & Shoker, 1993. The checklist reported 120 mite species pertaining to 18 families and 53 genera. Interestingly, the largest diversities of mite species were recorded to the Mesostigmata (50 species) and the Acaridida (45 species). Therefore, it is clear that, there are large numbers of mite pests (Acaridida species) inhabiting manure in Egypt, that may be transferred to agricultural crops when manure used in cultivation. On the other side, the diversity of the predatory mite species should be taken into consideration to establish control programs by using these species as a biological control agent to control the pest ones.

**Keywords:** Mites, Sohag, Egypt, Manure, Dung hills, Survey.

### INTRODUCTION

The Acaridida Latreille, 1802 is a diverse group of mites specialized for exploiting spatially or temporarily restricted habitats. The modified deutonymph (hypopus) in this group is specialized for dispersal and resisting adverse environmental conditions (O'Connor, 1982). Dispersal between habitat patches is affected by phoretic association between the specialized deutonymphs of the Acaridida mites and the host, which may be either another arthropod or a vertebrate (Hughes, 1976; O'Connor, 1991; Houck and O'Connor, 1991). Most species are living as saprophytic and fungivores in soil, litter, debris and organic manure, while others can be found on different economic plants, causing injury to plant directly by feeding, or by transmitting various disease agents (Zakhvatkin, 1941; Baker and Wharton, 1952; Scheucher, 1957; Hughes and Jackson, 1958; Hughes, 1961; Griffiths, 1977; O'Connor, 1994; Kettle, 1995). On the other side, The Acaridida mites are a very important food source for many Mesostigmata species, as the latter reduce the number of the former in different environments (on manure or plants).

Knowledge concerning the Acaridida fauna in Egypt is extremely poor as compared with the other groups of mites, such as: Mesostigmata and Prostigmata. Many points concerning to this group are questionable. However, several taxa were found to be new and several morphological characteristics were described. Many species and few genera affiliated to the Acaridida mites were recorded in Upper Egypt by: Eraky (1993; 1994a,b; 1997; 1998; 1999a,b,c; 2000a,b); Eraky and Shoker (1993a,b; 1994); Abu El-Maged (1998); Negm (2007); Eraky and Osman (2008a,b); Eraky et al. (2010); Abdelgayed et al. (2017); Eraky et al. (2017).

The work herein concerned with the species composition of mite species inhabiting manure and dung hills in the newly established animal production farm of the Faculty of Agriculture, Sohag University. An annotated list of mite species surveyed from animal farms in Egyptian Governorates was provided for both the present work and previous studies of certain authors. Such information is needed to support future ecological works of mite fauna inhabiting animal farms.

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### MATERIALS AND METHODS

Samples (10 replicates) were taken fortnightly from manure and dung hills of the experimental animal production farm, Faculty of Agriculture, Sohag University, during two years started from march, 2018. Each sample (500 g) was preserved in plastic bags labeled with necessary information, then transferred to the laboratory for extraction by using the modified Berlese's extractor apparatus. From the extracted arthropod fauna, mites were isolated in small vials, then cleared up in lactic acid (4 days), and mounted in Hayer's medium. The mounted slides were placed in an oven at 45-50°C (7 days) till dryness. The identification of mite species was done using illustrated keys established by: Scheucher (1957); O'Connor (1982); Zaher (1984a,b; 1986); Evans (1992); O'Connor (2001); Eraky and Osman (2008a); Eraky et al. (2010).

### RESULTS AND DISCUSSION

The mite fauna inhabiting animal farms in Egypt, currently include 120 species pertaining to 18 families and 53 genera of different mite groups. Most of the surveyed species were reported from the husbandry farms of animals by: Shoker and Eraky (1994); Abu El-Maged (1998); Negm (2007) (Assiut Governorate) and Abdel-Aziz (1999) (Sohag Governorate). The present study recorded only six species. Of these, two histostomatid (*Histiostoma arcuatus* Negm, 2007, *Hormosianoetus mahunkai* Eraky

& Shoker, 1993); single siteroptid species (*Siteroptes manure* Soliman & Kandeel, 1986); two macrochelid species (*Macrocheles solimani* Hafez, El-Badry & Nasr, 1985; *Macrocheles merdarius* (Berlese, 1889)) and one uropodid species (*Uropodiaspis aegyptiacus* Ahmed, 1984), from manure and dung hills of the experimental production farm of the Faculty of Agriculture, Sohag University. On the contrary, Abdel-Aziz (1999), recorded 35 species of mites (Tarsonemina, 3 species; Oribatei, 2 species; Acarididia, 16 species and Mesostigmata, 14 species), from three husbandries of animals at Sohag Governorate. While Shoker and Eraky (1994), surveyed 28 species of the Mesostigmata belonging to 9 families and 18 genera extracted from animal farms, also Negm (2007) recorded 47 species of different groups of mites at Assiut Governorate (Table 1). This difference between the scarce number of mite species collected in the current study and the number of mite species recorded from other farms, may be due to the fact that, the farms of high numbers of mite species were established from more than 35 years ago and that made the species stable, in comparison to the farm of the present study, which did not exceed five years of construction. Through the present study, attention is required to reduce the number of mite pests, which may be transmitted to agricultural crops. Also, attention must be taken into consideration to the predatory mites, to study their efficiencies in reducing the numbers of the phytophagous ones on different crops.

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

Order/family/species	Habitat	Location	Reference
<b>MESOSTIGMATA</b>			
<b>Ameroseiidae Evans, 1963</b>			
<i>Kleemaniaplumosus</i> (Oudemans, 1902)	Animal farm	Assiut, Sohag (Upper Egypt).	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<b>Ascidae Voigts &amp; Oudemans, 1905</b>			
<i>Proctolaelaps pygmaeus</i> (Müller, 1860)	Animal farm	Assiut, Sohag	(Abdel-Aziz, 1999; Negm, 2007).
<i>Protogamasellus denticus</i> Naser, 1978	Animal farm	Assiut	(Abu El-Maged, 1998; Negm, 2007).
<b>Blattisociidae Garman, 1948</b>			
<i>Lasioseiusthermophilus</i> (Willmans, 1942)	Animal farm	Assiut	(Abu El-Maged, 1998; Negm, 2007).
<i>Lasioseius zaheri</i> Nasr, 1987	Manure	Giza, Sohag (Upper Egypt).	(Zaher, 1986).
<i>Lasioseius aegypticus</i> Afifi, 1982	Organic manure	Giza	(Zaher, 1986).
<b>Digamasellidae Evans, 1957</b>			
<i>Digamasellus presepum</i> Berlese, 1918	Animal farm	Assiut	(Negm, 2007).
<i>Dendrolaelaps rasmi</i> Nasr & Mersal, 1986	Organic manure	Giza	(Zaher, 1986).
<b>Halolaelapidae Berlese, 1892</b>			

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<i>Halolaelaps sexclavatus</i> (Oudemans, 1902)	Animal farm	Assiut	(Abu El-Maged, 1998; Negm, 2007).
<b>Laelapidae Berlese, 1892</b>			
<i>Androlaelaps scalis</i> (Berlese, 1887)	Animal farm, Organic manure	Assiut, Sohag, El-Monofeia, Demiatta	(Zaher, 1986; Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007; Abdelgayed, 2017).
<i>Androlaelaps aegypticus</i> Hafez, El-Badry & Nasr, 1982	Organic manure	Giza	(Zaher, 1986).
<i>Androlaelaps zaheri</i> Hafez, El-Badry & Nasr, 1982	Organic manure	Giza	(Zaher, 1986).
<i>Androlaelaps fahrenheiti</i> (Berlese, 1911)	Animal farm	Assiut	(Negm, 2007; Abdelgayed, 2017).
<i>Ololaelaps bregetovae</i> Shereef & Soliman, 1980	Organic manure	Assiut	(Abdelgayed, 2017).
<i>Hypoaspis astronomicus</i> (Koch, 1839)	Animal farm	Assiut	(Negm, 2007).
<i>Hypoaspis arabicus</i> Hafez, El-Badry & Nasr, 1982	Organic manure	Giza	(Zaher, 1986).
<i>Hypoaspis miles</i> (Berlese, 1892)	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Hypoaspis bregetovae</i> Shereef & Afifi, 1980	Organic manure	Giza	(Zaher, 1986).
<i>Hypoaspis vacua</i> (Michael, 1891)	Animal farm	Assiut	(Abu El-Maged, 1998; Negm, 2007).
<i>Hypoaspis zachvatkinae</i> Shereef & Afifi, 1980	Organic cattle manure	Giza	(Zaher, 1986).
<i>Hypoaspis baloghi</i> Shereef & Afifi, 1980	Organic cattle manure	Giza	(Zaher, 1986).
<i>Hypoaspis pertrovae</i> Shereef & Afifi, 1980	Organic cattle manure	Al-Exandria (Lower Egypt).	(Zaher, 1986).
<i>Laelaspis astronomicus</i> (Koch, 1839)	Organic manure	Giza, Demiatta, El-Dakahleia (Lower Egypt).	(Zaher, 1986).
<i>Laelaspis volgini</i> Shereef & Afifi, 1980	Organic cattle manure	Giza	(Zaher, 1986).
<b>Macrochelidae Vitzthum, 1930</b>			
<i>Macrocheles krantzi</i> Evans & Hyatt, 1963	Animal farm	Assiut	(Abu El-Maged, 1998; Negm, 2007).
<i>Macrocheles merdarius</i> (Berlese, 1889)	Animal farm	Sohag	present study
<i>Macrocheles muscadomesticae</i> (Scopoli, 1772)	Animal farm	Sohag	(Abdel-Aziz, 1999; Negm, 2007).
<i>Macrocheles solimani</i> Hafez, El-Badry & Nasr, 1985	Animal farm	Sohag	present study
<i>Macrocheles shereefi</i> Hafez, El-Badry & Nasr, 1985	Organic manure	El-Ismaelia (Canal zone), Sinai.	(Zaher, 1986).
<i>Macrocheles glaber</i> (Müller, 1860)	Organic manure	All over the country	(Zaher, 1986).
<i>Macrocheles matrius</i> (Hull, 1925)	Organic manure	All over the country	(Zaher, 1986).
<i>Macrocheles sembelawanii</i> Hafez, El-Badry & Nasr, 1985	Organic manure	El-Dakahleia, El-Beheira, Kafr El-Skeikh (Lower Egypt).	(Zaher, 1986).
<i>Macrocheles africanus</i> Hafez, El-Badry & Nasr, 1985	Organic manure	Giza	(Zaher, 1986).
<b>Pachylaelapidae Vitzthum, 1931</b>			
<i>Zygoeius furciger</i> Berlese, 1916	Organic manure	Assiut	(Abdelgayed, 2017).
<b>Parasitidae Oudemans, 1901</b>			
<i>Parasitus beta</i> Oudemans & Voigts, 1904	Animal farm	Assiut	(Negm, 2007).

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<i>Parasitus lunaris</i> (Berlese, 1882)	Animal farm	Assiut	(Negm, 2007).
<i>Parasitus mammilatus</i> (Berlese, 1905)	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm,
<i>Parasitus numerous</i> Karg, 1965	Animal farm	Assiut	(Negm, 2007).
<i>Parasitus badrii</i> Hafez & Nasr, 1986	Organic manure	El-Beherira, Giza, El Gharbeia	(Zaher, 1986).
<i>Parasitus burchanensis</i> Oudemans, 1903	Organic manure	El-Gharbeia, El-Monofeia (Lower Egypt), Giza, Benisuef (Upper Egypt).	(Zaher, 1986).
<i>Pergamasus misellus</i> Berlese, 1904	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<b>Phytoseiidae Berlese, 1914</b>			
<i>Amblyseius moir</i> (Karg, 1970)	Animal farm	Assiut	(Negm, 2007).
<b>Uropodidae Kramer, 1881</b>			
<i>Fuscuropoda marginata</i> (Koch, 1839)	Animal farm	Assiut	(Negm, 2007).
<i>Leiodynychus krameri</i> (Canestrini, 1882)	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Trichouropoda krantzi</i> Hirschumann, 1961	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Trichouropoda patavina</i> (Canestrini, 1977)	Organic manure	Giza	(Zaher, 1986).
<i>Urodynychus pilosus</i> Ahmed, 1934	Animal farm	Assiut, Giza	(Zaher, 1986; Negm, 2007).
<i>Uropodiaspis aegyptiacus</i> Ahmed, 1984	Animal farm	Sohag	present study
<i>Uroobovella krantzi</i> Zaher & Afifi, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Chiropturopoda bakeri</i> Zaher & Afifi, 1986	Organic manure	Giza, Benisuef (Upper Egypt).	(Zaher, 1986).
<b>Astigmata (Acaridida)</b>			
<b>Acaridae Ewing &amp; Nesbitt, 1942</b>			
<i>Acotyledon khalifai</i> Eraky et al. 2000	Manure of animals	Sohag	(Eraky et al. 2000; Negm, 2007).
<i>Acotyledon manuri</i> Eraky, 1999b	Manure of animals	Assiut	(Eraky, 1999b; Negm, 2007).
<i>Acotyledon nerminka</i> Eraky, 1999b	Manure of animals	Assiut	(Eraky, 1999b; Negm, 2007).
<i>Acotyledon thernyshevi</i> (Zakhvatkin, 1941)	Animal-sheds, Animal farm	Assiut, Sohag	(Eraky and Nasser, 1993; Abu El-Maged, 1998; Abdel-Aziz, 1999).
<i>Acotyledon krameri</i> (Berlese, 1892)	Animal farm	Assiut, Sohag	(Abu El-Maged, 1998; Abdel-Aziz, 1999).
<i>Cosmoglyphus rizkii</i> Eraky et al. 2000	Manure of animals	Assiut	(Eraky et al. 2000; Negm, 2007).
<i>Cosmoglyphus manuri</i> Negm, 2007	Manure of animals	Assiut	(Negm, 2007).
<i>Caloglyphus arafati</i> Eraky, 2000a	Manure of animals	Assiut	(Eraky, 2000a; Negm, 2007).
<i>Caloglyphus oudemans</i> Zakhvatkin, 1937	Animal farm	Assiut	(Eraky and Nasser, 1993).
<i>Caloglyphus csibii</i> Eraky, 1999c	Animal farm	Assiut	(Eraky, 1999c; Negm, 2007).
<i>Caloglyphus labiduratus</i> Negm, 2007	Animal farm	Assiut	(Negm, 2007).
<i>Forcellinia mahunkai</i> Eraky, 1999d	Manure of animals	Sohag	(Eraky, 1999d; Negm, 2007).
<i>Calvolia solimani</i> Eraky, 1999b	Animal farm	Assiut	(Eraky, 1999b; Negm, 2007).
<i>Calvolia zaheri</i> Eraky, 1998	Animal farm	Assiut	(Eraky, 1998; Negm, 2007).
<i>Acarus clavatus</i> Negm, 2007	Manure of animals	Assiut	(Negm, 2007).

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	animals		
<i>Cosmoglyphus barbisetus</i> Eraky, 1999d	Animal farm	Assiut	(Eraky, 1999d; Negm, 2007).
<i>Caloglyphus berlesei</i> (Oudemans, 1902)	Animal farm	Assiut	(Abu El-Maged, 1998).
<i>Calvolia mahunkai</i> Negm, 2007	Manure of animals	Assiut	(Negm, 2007).
<i>Tyroglyphus putrescentiae</i> (Shrank, 1781)	Animal farm	Assiut, Sohag	(Eraky and Nasser, 1993; Abdel-Sater et al. 1995; Abu El-Maged, 1998; Abdel-Aziz, 1999; Abdel-Sater and Eraky, 2002).
<i>Calvolia heterocoma</i> (Michael, 1903)	Animal farm	Assiut, Sohag	(Eraky and Nasser, 1993; Abu El-Maged, 1998; Abdel-Aziz, 1999).
<i>Rhizoglyphus robini</i> Claparede, 1869	Animal farm	Assiut	(Abdel-Sater et al. 1995; Abdel-Sater and Eraky, 2002).
<b>Histiostomatidae Berlese, 1897</b>			
<i>Copronomia mahunkai</i> Eraky, 1999c	Animal farm	Assiut	(Eraky, 1999c; Negm, 2007).
<i>Copronomia sphaerocerae</i> (Vitzthum, 1922)	Animal farm	Assiut, Sohag	(Eraky and Nasser, 1993; Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Glyphanoetus mahunkai</i> Eraky, 1994a	Animal farm	Assiut, Sohag	(Eraky, 1994a; Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Glyphanoetus omari</i> Eraky et al. 2000	manure of animals	Sohag	(Erky et al. 2000; Negm, 2007).
<i>Glyphanoetus processum</i> Eraky, 1994a	Animal farm	Assiut	(Eraky, 1994a).
<i>Histiostoma alii</i> Eraky, 2000b	manure of animals	Sohag	(Eraky, 2000b; Negm, 2007).
<i>Histiostoma farghali</i> Eraky, 2000b	manure of animals	Sohag	(Eraky, 2000b; Negm, 2007).
<i>Histiostoma manuri</i> Eraky, 2000b	manure of animals	Sohag	(Eraky, 2000b; Negm, 2007).
<i>Histiostoma tinydorsalis</i> Eraky, 1999a	manure of animals	Assiut	(Eraky, 1999a; Negm, 2007).
<i>Histiostoma negmi</i> Eraky, 2000b	Manure of animals	Sohag	(Eraky, 2000b; Negm, 2007).
<i>Histiostoma essami</i> Eraky et al. 2000	manure of animals	Sohag	(Eraky et al. 2000).
<i>Histiostoma pickaxeii</i> Eraky & Shoker, 1993b	Animal-sheds, Skin of dead animals	Assiut, El-Minia	(Eraky and Shoker, 1993b; Eraky and Shoker, 1995; Abdel-Aziz, 1999; Negm, 2007).
<i>Histiostoma arcuatus</i> Negm, 2007	Animal farm	Sohag	present study
<i>Histiostoma camphori</i> Eraky, 1999d	Animal farm	Assiut	Eraky, 1999d; Negm, 2007;
<i>Histiostoma darwishii</i> Eraky, 1994a	Animal farm	Assiut, Sohag	Eraky, 1994a; Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<i>Histiostoma onioni</i> Eraky & Shoker, 1994	Animal-sheds	Sohag	(Abdel-Aziz, 1999).
<i>Histiostoma rizkii</i> Eraky, 1994	Animal-sheds	Sohag	(Abdel-Aziz, 1999).
<i>Histiostoma sarrai</i> Eraky & Shoker, 1994	Animal-sheds	Sohag	(Abdel-Aziz, 1999).
<i>Histiostoma nasseri</i> Eraky, 1994	Animal-sheds	Sohag	(Abdel-Aziz, 1999).
<i>Histiostoma sammari</i> Eraky, 1999d	Animal farm	Assiut	(Eraky, 1999d; Negm, 2007).
<i>Histiostoma zaheri</i> Eraky, 1997	Manure of animals	Assiut	(Eraky, 1997; Negm, 2007).
<i>Histiostoma solimani</i> Eraky, 1997	Manure of animals	Assiut	(Eraky, 1997; Negm, 2007).



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	animals		
<i>Hormosianoetus mahunkai</i> Eraky & Shoker, 1993a	Animal farm	Sohag	present study
<i>Myianoetus lili</i> Eraky, 1993	Animal farm	Assiut, Sohag	(Eraky and Nasser, 1993; Eraky, 1993; Abu El-Maged, 1998; Abdel-Aziz, 1999; Negm, 2007).
<b>TROMBIDIFORMES</b>			
<b>Caligonellidae Grandjean, 1944</b>			
<i>Caligonella humilis</i> Grandjean, 1838	Organic manure	El-Dakahleia (Lower Egypt).	(Zaher, 1986).
<i>Neognathus oteifi</i> Soliman & Gomaa, 1986	Organic manure	Giza	(Zaher, 1986).
<b>Cheyletidae Leach, 1815</b>			
<i>Acaropsella notchi</i> Gomaa & Hassan, 1986	Organic manure	Giza, El-Beherira, El-Monofeia, Assiut, Tahreer province.	(Zaher, 1986).
<i>Cheletomorpha lepidopterorum</i> (Shaw, 1794)	Organic manure	Several localities of Egypt.	(Zaher, 1986).
<i>Cheyletus badryi</i> Zaher & Hassan, 1986	Organic manure	Giza, Tahreer province, El-Qalyobia, El-Monofeia, Assiut, El-Sharkeia.	(Zaher, 1986).
<i>Cheyletus cacahuamilpensis</i> Baker, 1949	Organic manure	El-Monofeia, Al-Exandria, Kafr El-Sheikh.	(Zaher, 1986).
<i>Cheyletus eruditus</i> (Schrank, 1781)	Organic manure	Giza	(Zaher, 1986).
<i>Cheyletus malaccensis</i> Oudemans, 1930	Organic manure	Giza	(Zaher, 1986).
<i>Hemicheyletia congensis</i> (Cunliffe, 1962)	Organic manure	Giza, El-Fayoum, El-Monofia, Tahreer province.	(Zaher, 1986).
<i>Lepidocheyla solimani</i> Zaher & Hassan, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Grallacheles baker</i> De Leon, 1962	Organic manure	Giza, Kafr El-Sheikha.	(Zaher, 1986).
<i>Ker bakeri</i> Zaher & Soliman, 1967	Organic manure	Giza	(Zaher, 1986).
<i>Ker summersi</i> Gomaa & Hassan, 1986	Organic manure	El-Monofeia	(Zaher, 1986).
<i>Neoeucheyla ornate</i> Wafa & Soliman, 1968	Organic manure	Giza, Beisuef	(Zaher, 1986).
<b>Pygmephoridae Cross, 1969</b>			
<i>Trochometridium aegypticus</i> Yousef & Kandeel, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Pediculaster arabicus</i> Zaher & Kandeel, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Moseriella africanus</i> Zaher & Kandeel, 1986	Organic manure	Assiut	(Zaher, 1986).
<b>Stigmaeidae Oudemans, 1931</b>			
<i>Apostigmaeus navicella</i> Grandjean, 1944	Organic manure	Giza	(Zaher, 1986).
<i>Apostigmaeus aegypticus</i> Soliman & Gomaa, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Stigmaeus banksi</i> Gomaa & Hassan, 1986	Organic manure	Giza, El-Qalyabia (Lower Egypt).	(Zaher, 1986).
<i>Stigmaeus triramus</i> Soliman & Gomaa, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Stigmaeus africanus</i> Soliman & Gomaa, 1986	Organic manure	El-Dakahleia, El-Gharbeia (Lower Egypt).	(Zaher, 1986).

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Siteroptidae Mahunka, 1970			
<i>Siteroptes serratesetae</i> Soliman & Kandeel, 1986	Organic manure	El-Sharkia (Lower Egypt).	(Zaher, 1986).
<i>Siteroptes posterotruncata</i> Yousef & Kandeel, 1986	Organic manure	Giza	(Zaher, 1986).
<i>Siteroptes manurei</i> Soliman & Kandeel, 1986	Animal farm	Sohag	present study

### REFERENCES

- [1] **Abdel-Aziz, S.M. 1999.** Ecological and Taxonomical Studies on some Acaridia Mites in Upper Egypt. *M.Sc. Thesis, Fac. Agric, Univ., Assiut*, 122 pp.
- [2] **Abdelgayed, A.S. 2017.** Species composition of phytophagous and predatory mites associated with citrus orchards in Assiut Governorate. *M.Sc. Thesis, Fac. Agric, Univ., Assiut*, 155 pp.
- [3] **Abdelgayed, A.S.; Negm, M.W.; Eraky, S.A.; Helal, T.Y. and Moussa, S.F.M. 2017.** Phytophagous and predatory mites inhabiting citrus trees in Assiut Governorate, Upper Egypt. *Assiut Journal of Agricultural Sciences*, 48(1): 173–181.
- [4] **Abdel-Sater, M.A. and Eraky, S.A. 2002.** Bulbs mycoflora and their relation with three stored product mites. *Mycopathologia*, 153: 33–39.
- [5] **Abdel-Sater, M.A.; Hemida, S.K.; Eraky, S.A. and Nasser, M.A.K. 1995.** Distribution of fungi on two mite species and their habitats in Egypt. *Folia Microbiol.*, 40(3): 304–313.
- [6] **Abu El-Maged, T.M. 1998.** Recent Trends for Controlling some Harmful Arthropods in the Husbandry. *M.Sc. Thesis, Fac. of Agric., Univ. of Assiut*, 97 pp.
- [7] **Baker, E.W. and Wharton, G.W. 1952.** An Introduction to Acarology. *New York Macrhillan*, 465 pp.
- [8] **Eraky, S.A. 1990.** Taxonomy and ecology of some Acarida mites. *Ph.D. Thesis, Hungarian Academy of Science, Budapest, Hungary*. 113 pp.
- [9] **Eraky, S.A. 1993.** *Myianoetus lili* sp. n. (Acari: Anoetidae) educed from manure, Assiut, Upper Egypt. *Folia ent. hung.*, 54: 47–49.
- [10] **Eraky, S.A. 1994a.** Three new anoetid mites extracted from animal excrement and from garlic (Acarina: Anoetidae). *Folia ent. hung.*, 55: 217–223.
- [11] **Eraky, S.A. 1994b.** Two new hypopi of *Histiostoma* Kramer, 1876 (Acari: Astigmata) recovered from pomegranate and date fruits. *Assiut J. Agric. Sci.*, 25(2): 157–162.
- [12] **Eraky, S.A. 1997.** A key to new and old histiostomatid deutonymphs recorded in Assiut area with descriptions of two new species (Acari: Histiostomatidae). *Assiut J. Agric. Sci.*, 28 (1): 99–116.
- [13] **Eraky, S.A. 1998.** *Mahunkaglyphus solimani* gen. and sp. n. and three new species (Acari: Astigmata) described from termite nests, western desert, Egypt. *Folia ent. hung.*, 59: 241–250.
- [14] **Eraky, S.A. 1999a.** A new genus and three new species of mites (Acari: Acaridida) phoretic on termites infesting the camphor trees in Aswan, Egypt. *Annals hist. nat. Mus. natu. hung.*, 91: 209–217.
- [15] **Eraky, S.A. 1999b.** Five new hypopial nymphs (Acari: Acaridae and Histiostomatidae) described from different habitats. *Folia ent. hung.*, 60: 45–56.
- [16] **Eraky, S.A. 1999c.** Seven new species of mites (Acari: Acaridida) educed from different habitats in Upper Egypt. *Assiut J. Agric. Sci.*, 30(5): 65–80.
- [17] **Eraky, S.A. 1999d.** Four new species of genus *Histiostoma* Kramer, 1876 (Acari: Astigmata) subsistent in manure and dunghills. *8<sup>th</sup> Nat. Conf. of Pests & Dis. Of Veg. & Fruits in Ismailia*, 1: 1491–60.
- [18] **Eraky, S.A. 2000a.** Identification key for some Acaridida mites (hypopi) (Acari: Astigmata) with descriptions of two new species. *Assiut J. Agric. Sci.*, 31: 341–371.
- [19] **Eraky, S.A. 2000b.** Morphological characters used in the taxonomy of the Acaridida mites. *A Review Article Submitted to the Egyptian Scientific Committee for Promotion to Professorship*, 66 pp.
- [20] **Eraky, S.A. and Nasser, M.A.K. 1993.** Seasonal abundance of some Acaridida species at an animal-farm. *Assiut J. Agric. Sci.*, 24(2): 211–222.
- [21] **Eraky, S.A. and Osman, M.A. 2008a.** *Caloglyphus manuri* sp. n. (Acaridida: Acaridae) extracted from chicken manure, Mansoura, Egypt. *Acarines*, 2: 43–44.
- [22] **Eraky, S.A. and Osman, M.A. 2008b.** Some biological aspects and life table parameters of *Caloglyphus manuri* Eraky & Osman (Acaridida: Acaridae) fed on different kinds of food. *Acarines*, 2: 45–48.
- [23] **Eraky, S.A. and Osman, M.A. 2008c.** New identification key for some Acaridides (Acaridida) from Upper Egypt, with description of a new Acaridae species. *Acarines*, 2: 49–60.
- [24] **Eraky, S.A. and Shoker, N.I. 1993a.** Mites extracted from uprooted banana sucker (Acari: Anoetidae). *Folia. ent. hung.*, 54: 51–56.
- [25] **Eraky, S.A. and Shoker, N.I. 1993b.** Description of two new anoetid mites (Acari: Anoetidae) collected from different habitats. *Assiut J. Agric. Sci.*, 24(2): 233–241.

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- [26] **Eraky, S.A. and Shoker, N.I. 1994.** Two new deutonymphs of the genus *Histiostoma* Kramer, 1876 (Acari: Histiostomatidae) existing in stored onions. *Assiut J. Agric. Sci.*, 25(2): 163–168.
- [27] **Eraky, S.A. and Shoker, N.I. 1995.** The description of two new anoetid mites (Acari: Anoetidae) deriving from different habitats. *Folia entomologica Hungarica rovariani Közlemények*. 56: 21–26.
- [28] **Eraky, S.A.; Rizk, M.M.A.; Abdel-Gawad, K.H. and Abdel-Aziz, S.M. 2000.** Description of four new mite species (Acari: Astigmata) collected from manure of animals, Sohag, Upper Egypt. *XV. National Biology Congress, 5-9 Sept., Ankara, Turkey*.
- [29] **Eraky, S.A.; Abdel-Galil, F.A. and Bohibah, M.K. 2010.** Identification key for some phoretic acaridids (Acari: Acaridida) from Upper Egypt with description of two new species. *Assiut J. Agric. Sci.*, 41(3): 76–92.
- [30] **Evans, G.O. 1992.** Principles of Acarology. *CAB International, University Press, Cambridge, UK, Wallingford*, 563 pp.
- [31] **Griffiths, D.A. 1977.** A new family of astigmatid mites from lies Crozet, Sub Antarctica: Introducing a new concept relating to ontogenetic development of the idiosomal setae. *Journal of Zoology (Lond)*, 182: 291–308.
- [32] **Houck, M.A. and OC'onnor, B.M. 1991.** Ecological and evolutionary significance of phoresy in the Astigmata. *Ann. Rev. Entomol.*, 36: 611–636.
- [33] **Hughes, A.M. 1961.** The mites of stored food. *Tech. Bull. Minist. Agric. London*, 9: 1–281.
- [34] **Hughes, A.M. 1976.** The mites of stored food and houses. *Tech. Bull. Minist. Agric. Fisheries and Food*, 9: 1–379.
- [35] **Hughes, R.D. and Jackson, C.G. 1958.** A review of the Anoetidae (Acari). *Virginia J. Sci.*, 9. (New Series): 1–198.
- [36] **Kettle, D.S. 1995.** Medical and veterinary entomology, 2nd edition. *C.A.B. International, Wallingford, Oxon, UK*, 725 pp.
- [37] **Negm, M.W. 2007.** Taxonomy and Ecology of Some Acarid and Histiostomatid Mite Species in Assiut Governorate. *M.Sc. Thesis, Fac. of Agric, Assiut Univ., Egypt*, 100 pp.
- [38] **OC'onnor, B.M. 1982.** Evolutionary ecology of astigmatid mites. *Annu. Rev. Entomol.*, 27: 385–409.
- [39] **OC'onnor, B.M. 1991.** A preliminary report on the arthropod associated Astigmatid mites (Acari: Acariformes) of the Huron Mountains of Huron Mountains of Northern Michigan, *Academician*, 24: 307–320.
- [40] **OC'onnor, B.M. 1994.** Life history modifications in Astigmatid mites (ed. Houck), *Chapman and Hall, New York, London*, 6: 136–159.
- [41] **OC'onnor, B.M. 2001.** Acaroid mites (Acari: Astigmata) associated with termites (Isoptera). *University of Michigan, Museum of Zoology, 1109 Geddes Ave, Ann Arbor, MI*.
- [42] **Scheucher, R. 1957.** Systematik and okologie der deutschen Anoetiden. In: *Stammer, H.J. (ed.): Beitrage Zur Systematik und Okologie Mittle europascher Acarina*, 1: 233–284.
- [43] **Shoker, N.I. and Eraky, S.A. 1994.** Incidence of some predaceous mesostigmatid mite species at animal farm, Assiut, Upper Egypt. *El-Minia Sci. Bull.*, 7(1): 57–65.
- [44] **Zaher, M.A. 1984a.** Survey and Ecological Studies on Phytophagous, Predaceous and Soil Mites in Egypt. 1. Phytophagous mites in Egypt (Nile Valley and Delta). *PL 480 Programme U.S.A., Project No. EG\_ARS\_30. Grant No. FG\_EG\_139*. 228 pp.
- [45] **Zaher, M.A. 1984b.** Survey and Ecological Studies on Phytophagous, Predaceous and Soil Mites in Egypt. III. *Mites of Sinai. PL.480 Programme U.S.A., Project No. EG\_ARS\_30. Grant No. FG\_EG\_139*. 36 pp.
- [46] **Zaher, M.A. 1986.** Survey and Ecological Studies on Phytophagous, Predaceous and Soil Mites in Egypt. II-A: Predaceous & Nonphytophagous Mites (Nile Valley and Delta). *Text. PL. 480 Programme U.S.A., Project No. EG\_ARS\_30, Grant No. FG\_EG\_139*. 567 pp.
- [47] **Zakhvatkin, A.A. 1941.** AIBS translation of: *Fauna of USSR. Arachnoidea*, 6(1): Tyroglyphoidea.

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