

Biodiversity of Mites Associated with Parrots and Peacocks in Giza Zoo, Egypt

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ABSTRACT

During fall season, biodiversity of mites collected from parrots and Peacocks was recorded in Giza Zoo. Samples of dust, litter and debris from bird cages were examined. Mites were extracted using modified Tullgren funnel and mounted in Hoyer's medium on microscopic slides for examination. Seventeen mite species of 15 genera belong to ten families were identified. These families belong to four suborders as follow: four to Actinedida, two to Gamasida, three to Acaridida and one to Oribatida. Three species were firstly recorded; one belongs to the family Acaridae and the others to the family Cheyletidae. Types of habits of collected acari fauna were noted: predacious (35.2%), fungivorous (3.2%), parasitic (0.8%), phytophagous (4%), allergen (56.8%).

KEY WORDS: Acari, Parrots, Peacocks, Biodiversity, Actinedida, Gamasida, Acaridida, Oribatida, Egypt.

INTRODUCTION

Acari are noted in almost every habitat available to animal life. Thus, some investigators directed their work towards mites associated with birds. Baker (1949) mentioned that, *Acaropsellina docta* (Berlese) occurred in large numbers in sparrow nests but less abundant in those of other birds. He also added that *Cheletomorpha venustissima* (Koch), *Cheyletia flabellifera* (Mich.) and *Cheyletus eruditus* (Schrank) were found in the nests. In Egypt, Wafe & Soliman (1968) found the cheyletid mite *Acaropsella aegyptiaca* (Wafa & Soliman) in bird nests. Twenty one mite species belonging to eight families in different bird nests in New York were recorded by Baker *et al.* (1976). Mohamed and Rakha (1980) recorded ten species in seven families of the suborders, Prostigmata, Mesostigmata and Astigmata inhabiting sparrow nests in Giza region. Rakha (1980) surveyed 62 newly recorded mite species associated with birds in Egypt. These represented 32 genera in 14 families of the five superfamilies: Analgoidea, Pterolichoidea, Freyanoidea, Psoroptoidea and Cytoditoidea. Of these species, 18 were considered new species. Abd-Alla (1993) collected 41 species, representing 35 genera, in 24 families belonging to the four suborders: Acaridida, Actinedida, Gamasida and Ixodida inhabiting wild birds. Eighteen of the mites were new species and two genera were new. In 1999, Morsy *et al.* studied the mite fauna of *Passer domestica niloticus* and *Streptopelia senegalensis aegyptiaca* captured in Sharkia and Qalyobia Governorates. They collected 31 species belonging to 23 genera, 17 families of three suborders. Solarz *et al.*, (2004) collected ten species of astigmatid mites from different macawws and cockatiels (*Ara*

ararauna and *Nymphicus hollandicus*) in the Silesian Zoo, Poland. Those mites were belonging to four families: Acaridae, Glycyphagidae, Anoetidae and Pyroglyphidae.

Therefore, the present study deals with the occurrence, prevalence and species composition of predacious, phytophagous, fungivorous, parasitic and allergen mites associated with bird cages of Giza Zoo.

MATERIALS AND METHODS

This study was carried out in Giza Zoo during fall season 2007. Sixty samples of litter and debris from cages of ten kinds of birds from parrots and peacocks including [*Psittacus erithacus* (African Gray Parrot), *Pavo cristatus* (Common Peacock), *Padda oryzivora* (Java Finch), *Cacatua galerita* (Greater Sulphur-Orested Cockatoo), *Nymphicus hollandicus* (Pied Cockatiel), *N. hollandicus* (White Cockatiel), *Ara ararauna* (Red-Blue Macaww), *A. ararauna* (Blue & Yellow Macaww), *Amazona xanthops* (Yellow Faced Amazon) and *Eos bornea* (Red Lory) were collected. Samples were kept in polyethylene bags, and then transferred to the laboratory for mite extraction. Mites were extracted using modified Tullgren funnels, mounted on glass slides in Hoyer's medium, for identification. Mites population densities were assessed as the number of specimens per sample of the material analyzed. Because of difficulties with standardization mite collection, the calculation of mite numbers of each taxon per sample was recommended as the best method for determining mite exposure (Platts-Mills *et al.*, 1990).

RESULTS AND DISCUSSION

From 60 examined samples the total extracted mite species was 125 individuals including 17 species of 15 genera, ten families and four suborders. These are: of the Suborder Actinedida, *Cheletogenes ornatus* Can. & Fanz, *Cheyletus fortis* Oudemans, *Cheyletus malaccensis* Oudemans, *Acaropsella kulagini* Rohdendorf, *Acaropsellina sollers* Rohdendorf, *Neoeucheyla ornata* Wafa & Soliman and *Hemicheyletia bakeri* (Ehara) (Family Cheyletidae); *Raphignathus arabicus* Gomaa & Hassan* (Family Raphignathidae); *Paratriophtydeus plummeri* (Baker) (Family Tydeidae); *Tetranychus cucurbitacearum* (Sayed) (Family Tetranychidae); of the Suborder Gamasida, *Macrocheles africanus* Hafez, El Badry & Nasr(1985) (Family Macrochelidae); *Androlaelaps casalis* (Berlese) (Family Laelapidae); of SubOrder Oribatida, *Rostrozetes citri* Nasr & Hassan (Family: Haplozetidae); of the Suborder Acaridida, *Dermatophagoides farinae* Hughes, (Family Pyroglyphidae), *Glycyphagus domesticus* (De Geer), *Glycyphagus ornatus* Kramer (Family Glycyphagidae); *Caloglyphus oudemansi* (Zachvatkin) (Family Acaridae).

The Suborder Actinedida included the greatest number of genera and families, while the Acaridida was the second (Table 1). In contrast, genera and families of the Gamasida and Oribatida were few. Ten species of the actinedida were identified. They belong to four families: Cheyletidae, Raphignathidae, Tydeidae and Tetranychidae. The family Cheyletidae included the greatest number of species (seven species). This was parallel with those reported by Mohamed and Rakha (1980). Among these cheyletids, two species were considered as first record, *C. fortis* and *A. kulagini*. One species represented each of the families: Raphignathidae, Tydeidae and Tetranychidae. Only two species of Gamasida belonging to the families Macrochelidae and Laelapidae were also collected in a few numbers. One species of the family: Haplozetidae from Oribatida was found with common peacock (*Pavo cristatus*) in a few numbers.

Suborder Acaridida included the greatest number of individuals but not the species (Table1). It was represented by the three genera *Glycyphagus*, *Caloglyphus* and *Dermatophagoides*. *G. domesticus* of the family Glycyphagidae was collected in high numbers, while *C. oudemansi* of the family

Acaridae has been firstly recorded and found in rare numbers.

The house dust mite, *D. farinae* of the family Pyroglyphidae was found in relatively great numbers associated with parrots. This agrees with that mentioned by Rakha 1980 and Solarz *et al.* 2004 who cited that *D. farinae* was associated with parrots, canids and artiodactyls.

According to their habits, acaridid mites species presented (56.8%) of collected mite population, followed by the predacious ones which presented (35.2%), fungivorous (3.2%), phytophagous (4%) then parasitic (0.8%)(Table1). Occurrence of acaridida comprised *G. domesticus* (37.6%), *D. farinae* (10.4%), *G. ornatus* (8%) and *C. oudemansi* (0.8%). Some of these mites, may considered as allergic mites. In addition, the phytophagous mite, *T. cucurbitacearum* (4%) has been recently considered as allergic mite by Arlian and Platts-Mills (2001) and Arlian (2002) who mentioned that, the two-spotted spider mite *Tetranychus urticae* Koch and the European red mite *Panomychus umli* (Koch) which are common pests of plants, were recently discovered to induce IgE-mediated allergy reactions in humans. Solarz *et al.* (2004) stated that both allergic species of astigmatid and tetranychid constituted 45.61% of all mites found in the Silesian Zoo.

Fourty-four collected mite individuals were predators, while only one species was parasite (Table 2). These predacious mites determined (35.2%) and considered as a big group to attack allergic and phytophagous mites to decrease its population.

Concerning birds, *Pavo cristatus* (Common Peacock) appeared to be the one that had numerous number of mite species among them three species belong to Acaridida (Table2). Consequently, it may be advisable to avoid direct contact with this bird followed by *Padda oryzivora* and *Psittacus erithacus* (African Gray Parrot). All the birds rest nests had only the predacious mites, while the phytophagous one was associated with *Eos bornea* (Red Lory) and *Nymphicus hollandicus*.

Only four fungivorous were surveyed. These mites may feed on harmful and pathogenic fungi inhabiting birds nests and representing 3.2% of the total mites.

* Cited by Zaher 1986.

Table (1): Species list, occurrence, frequency and mean number of mites per sample, and per total samples from the examined places in the Giza Zoo.

Mite group	Mite taxa	Frequency			
		No. of samples	Total number of mites collected	% of the total count	Mean no. of mites per sample
Allergic	<i>Dermatophagoides farinae</i>	06	13	10.4	2.17
	<i>Glycyphagus domesticus</i>	12	47	37.6	4.70
	<i>G. ornatus</i>	03	10	08.0	3.33
	<i>Caloglyphus oudemansi</i>	01	1	00.8	1.00
Total			71	56.8	
Fungivorous	<i>Paratriophtydeus plummeri</i>	01	01	00.8	01.0
	<i>Rostrozetes citri</i>	02	03	02.4	01.5
Total			04	03.2	
Predacious	<i>Cheletogenes ornates</i>	01	01	00.8	01.0
	<i>Cheyletus fortis</i>	04	04	03.2	01.0
	<i>C. malaccensis</i>	02	02	01.6	01.0
	<i>Acaropsella kulagini</i>	07	14	11.2	02.0
	<i>Acaropsellina sollers</i>	12	19	15.2	1.58
	<i>Neoeucheyla ornate</i>	01	01	00.8	01.0
	<i>Hemicheyletia bakeri</i>	01	01	00.8	01.0
	<i>Raphignathus arabicus</i>	01	01	00.8	01.0
<i>Macrocheles africanus</i>	01	01	00.8	01.0	
Total			44	35.2	
Parasitic	<i>Androlaelaps casalis</i>	01	01	00.8	01.0
Phytophagous	<i>T. cucurbitacearum</i>	04	05	04.0	1.25

Table (2): Incidence of different mite species in bird cages at Giza Zoo, Egypt.

Bird species	Mite species
<i>Psittacus erithacus</i> (African Gray Parrot)	<i>Dermatophagoides farinae</i> Hughes, <i>Cheyletus malaccensis</i> Oudemans, <i>Acaropsellina sollers</i> Rohdendorf, <i>Neoeucheyla ornata</i> Wafa & Soliman
<i>Pavo cristatus</i> (Common Peacock)	<i>Dermatophagoides farinae</i> Hughes, <i>Glycyphagus domesticus</i> (De Geer), <i>G. ornatus</i> Kramer, <i>Paratriophtydeus plummeri</i> (Baker), <i>Cheyletus fortis</i> Oudemans, <i>Caloglyphus oudemansi</i> (Zachvatkin), <i>Acaropsellina sollers</i> Rohdendorf, <i>Raphignathus arabicus</i> Gomaa & Hassan, <i>Macrocheles africanus</i> Hafez, El Badry & Nasr(1985), <i>Androlaelaps casalis</i> (Berlease), <i>Rostrozetes citri</i> Nasr & Hassan, <i>Dermatophagoides farinae</i> Hughes
<i>Padda oryzivora</i> (Java Finch)	<i>Dermatophagoides farinae</i> Hughes, <i>Cheyletus fortis</i> Oudemans, <i>Acaropsellina sollers</i> Rohdendorf
<i>Cacatua galerita</i> (Greater Sulpher-Orested Cockatoo)	<i>Cheletogenes ornates</i> Can. & Fanz.
<i>Nymphicus hollandicus</i> (Pied Cockatiel)	<i>Acaropsella kulagini</i> Rohdendorf, <i>Acaropsellina sollers</i> Rohdendorf, <i>Tetranychus cucurbitacearum</i> (Sayed)
<i>N. hollandicus</i> (White Cockatiel)	<i>Acaropsella kulagini</i> Rohdendorf, <i>Acaropsellina sollers</i> Rohdendorf
<i>Ara ararauna</i> (Red-Blue Macaww)	<i>Acaropsella kulagini</i> Rohdendorf
<i>A. ararauna</i> (Blue & Yellow Macaww)	<i>Acaropsella kulagini</i> Rohdendorf
<i>Amazona xanthops</i> (Yellow Faced Amazon)	<i>Acaropsellina sollers</i> Rohdendorf, <i>Hemicheyletia bakeri</i> (Ehara)
<i>Eos bornea</i> (Red Lory)	<i>Tetranychus cucurbitacearum</i> (Sayed)

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