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Mites associated with some birds in El-Minia Governorate, Upper Egypt

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ABSTRACT

The present study was conducted for three years (1995-1998) to throw some light on the acarofauna of some common wild and domestic birds that are in close association with man in El-Minia governorate, aiming to pave the way for controlling this parasitic group of mites that threatens bird's life and productivity. The study revealed the presence of 24 species of mites, belonging to 14 families and three suborders (Astigmata, Prostigmata and Mesostigmata). The parasitic mites detected in the present study included feather mites of families Dermoglyphidae, Analgidae, Harpyrhynchidae and Syringophilidae, skin mites of families Epidermoptidae, Knemidokoptidae, Laminosioptidae and Cheyletiellidae; and haematophagous mites of family Macronyssidae. These mites were detected on the infested birds in fluctuated rates of prevalence and abundance and with variable intensities of infestation. The feather mites, *Paralges pachenemys* and *Dermoglyphus columbae* (Dermoglyphidae) were the most frequently encountered species on both wild and domestic birds. The wild birds harboured higher numbers of parasitic mite species than the domestic ones. The other detected mites (the non-parasitic ones) were found in relatively few numbers. Eleven species of the recovered mites have been firstly recorded on the Egyptian birds. A key to the detected mites was constructed and illustrated with drawings.

KEYWORDS: birds, wild, domestic, mites, El-Minia, Egypt.

INTRODUCTION

Mites associated with birds have different relationships, ranging from accidental association with non-parasitic mites to true parasitism with both ecto-and endo-parasitic mites (Zumpt 1961; Krantz 1978). Parasitic mites cause considerable economical losses to the domestic bird industry, manifested by poor feeding, reduction in productivity and in egg quality, weight loss, transmission of diseases agents and mortality (Arends *et al.* 1997). Similarly, parasitic mites are a threat to wild birds, being agents of various diseases such as otitis, podoknemidokoptiasis, arthritis, lethal body mange, anemia and death (Mattos *et al.* 1996; Pence *et al.* 1999; Orton 2000). Some parasitic mites affect the feathers, causing feather loss, feather picking and feather abnormalities (Baker 1996; Rosskopf & Woerpel 1996; Harper 1999).

According to the available literature numerous surveys of the parasitic mites associated with domestic and wild birds have been undertaken over the last 75 years in various parts of the world, but only limited studies were carried out in Egypt (Rakha 1980; Mohammed & Rakha 1980; Zaher & Rakha 1981; El-Bishlawy & Oyoun 1989; Abd -Alla 1993; Mohamed 1994; Mazyad *et al.* 1999; Morsy *et al.* 1999). Therefore, the present study was conducted to detect the mite species of some of the common wild and domestic birds in El-Minia Governorate and to examine some aspects of their ecology. An illustrated key was constructed for future work on this group of mites.

MATERIALS AND METHODS

Mite species associated with some of the common wild and domestic birds were surveyed in different localities in El-Minia Governorate, for three years (1995-1998). Domestic birds were obtained from local markets, while wild ones were trapped from different areas in and around El-Minia City. A total of 280 wild and 215 domestic birds were examined.

The wild birds were represented by palm dove *Streptopelio senegalensis aegyptiaca* (100); house sparrow, *Passer domesticus niloticus* (100); and buff-backed heron, *Ardeola ibis ibis*

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(80). The domestic pigeon, *Columbia livia domestica* (120); the domestic fowl, *Gallus gallus domesticus* (53), goose, *Anser anser* (20) and duck, *Anas platyrhynchos platyrhynchos* (22) were chosen to represent domestic birds.

The birds were individually examined, using a hand lens to look for any lesions and for large ectoparasitic mites. Body areas were examined carefully by a stereomicroscope. Mites were collected by a fine camelhair brush. Feathers were collected from each bird and placed individually in modified Berlese funnels for 24 hours to collect the motile as well as quill mites into Petri dishes (Zumpt 1961). For collecting immotile or dead mites, a technique adapted from Lipovsky (1951) was used. Feathers were immersed in a beaker containing a detergent. The beaker was shaken for about 30 minutes, then the feathers were separated and the sedimented mites were isolated using a stereomicroscope. For permanent preparation, mites were cleared in lactic acid, washed in ethyl alcohol and mounted in Hoyer's medium (Krantz 1978). The cleared specimens were counted examined and identified by phase-contrast microscope and were drawn using a camera lucida.

Mites were identified to species using the keys given by Baker *et al.* (1956), Zumpt (1961), Fain (1965), Kethly (1970), Smiley (1970), Hughes (1976) and Krantz (1978).

RESULTS

Infestation rate of the examined birds with mites: Table 1 shows that mites were more frequently detected on the wild birds, *Streptopelia senegalensis aegyptiaca*, followed by *Passer domesticus niloticus* and *Ardeola ibis ibis*. Among the domestic birds examined, *Anser anser* was the most highly infested host, followed by *Anas platyrhynchos* and *Gallus gallus domesticus*, while *Columba livia domestica* had the lowest infestation.

Faunal composition of the collected mites: A total of 24 species of mites were collected belong to 14 families and 3 suborders. The suborder Astigmata included 3 feather mites of families Analgidae (*Megninia cubitalis*) and Dermoglyphidae(*Dermoglyphus columbae* and *Paralges pachenemys*), 5 skin parasites of families Epidermoptidae(*Strelkoviacarus quadratus, Myialges falconis* and *M. Pici*), Laminosioptidae (*Fianocoptes nizoni*) and Knemidokoptidae (*Knemidokoptes mutanus*) and two storage mites of family Acaridae (*Tyrophagus putrescentiae* and *Acarus siro*). The suborder Prostigmata included 5 skin parasites of family Cheyletiellidae (*Ornithocheyletia gersoni, O. hallae, O. lukoschusi, O. canadensis* and *O. pinguis*), 2 feather mites of family Harpyrhynchidae (*Harpyrhynchus vercammni*) and Syringophilidae (*Syringophilus minor*) and one mycophagous mite of family Caligonellidae (*Molothrognathus seusius*). The suborder Mesostigmata included 3 haematophagous mites of family Macronyssidae (*Pellonyssus* sp., *Ornithonyssus bacoti,* and *Ornithonyssus sylviarum*) 2 predators of families Ascidae and Laelapidae and one mycophagous mite of family Amerosiidae (*Kleemannia plumosus*).

Prevalence, intensity of infestation and relative abundance of mite species on the infested birds: Data in Table 2 reveal that the highest number of mite species were collected from palm dove (10 species), followed by house sparrows (8 species), buff-backed herons and chickens (5 species each), pigeons and geese (4 species each) and ducks (one species).

Concerning the wild birds, *Dermoglyphus columbae* was the most prevalent and abundant mite species on Palm doves, followed by *Paralegs pachenemys*, *Harpyrhynchus vercammni*, and Ornithocheyletia *hallae*, in prevalence and by *H. vercammni, M. cubitalis* and *P. pachenemys* in relative abundance. The highest intensity of infestation was recorded for *M. cubitalis*, followed by *D. columbae* and *H. vercammni*, while the other mite species were relatively rare. On house sparrows, *Syringophilus minor* was found to be the most prevalent and abundant species that had the highest intensity of infestation, followed by *Strelkoviacarus quadratus*, *Ornithocheyletia gersoni*. On buff-backed herons, *T. putrescentiae,* was far more abundant and

prevalent than the other detected mite species, although it had markedly low intensity of infestation. With regard to the domestic bird the most common mite species, *Dermoglyphus columbae, Paralegs pachenemys* and *T. putrescentiae* were recorded on equal numbers of chickens, where the first species was the most abundant one, having the highest intensity of infestation. On pigeons, *D. columbae* and *P. pachenemys* also constituted the highest rates of abundance although the first species was more frequently detected than the second one that had the highest intensity of infestation. On geese, *P. pachenemys* was the most prevalent and abundant one, as compared to the other mite species recorded on this host. Also, it was the sole species that was found on all the examined ducks. A marked high intensity of infestation was recorded for this mite species on both domestic birds.

Key for identification of the collected mites of subclass Acari

1-Without visible stigmata posterior to coxae II; propodosomal sensory organs, when present, in the form of simple sensilla; coxae often fused into ventral body wall, forming coxisternal region …… Order: Acariformes 2

-With one dorsolateral or ventrolateral stigmata posterior to coxae II or IV; specialized propodosomal sensory organs absent, free coxae distinct. . . . . …….. Order: Parasitiformes 3

2- Palpi with only two segments, discrete stigmatal openings absent, pretarsus with an empodial claw and fleshy pulvillus or pretarsus sucker-like, true claws absent, without spcialized sensory organs on propodosoma. . … . . . . . …… Suborder: Astigmata 4

-Palpi sometimes minute but with 3-5 recognizable segments, palpi simple or modified into a thumb-claw process, stigmatal openings present or absent, when present, open at or between the base of the chelicerae, at the base of the gnathosoma or at the humeral angles of the propodosoma, empodial processes commenly pad-like often with tenent hairs, occasionally with claw-or sucker and rarly absent Propodosomal sensory organs present or absent. . . . . ……..Suborder: Prostigmata 12

3-With subterminal tined apotele on the palpal tarsus, hypostome serving only as part of the floor of the gnathosoma; with one pair of stigmata between coxal intervals II-III or III-IV commonly ventrolateral in position; peritremes generally present ……. Suborder: Mesostigmata 18

-Pedipalpal tarsus without apotele; hypostome modified into a piercing organ with retrorse teeth, dorsum of tarsus I with a distinct sensory pit (Haller's organ); stigmata behind coxae IV on a stigmal plate, peritremes absent. . . . . …….. Suborder: Metastigmata.

4-Tibia I and II with two setae and a dorsal whip like solenidion Φ, ambulacral pulvillus and empodial claw present on the tarsi. With two pairs of well developed genital suckers. With at least one pair of vertical setae in both sexes. Tarsus I –II with one solendion omega (ω). . . . …… 5

-Tibia I –II with only one setae plus the dorsal solendion Φ tarsi with membranous ambulacral discs or with claw-like setae or spines. Genital sucker absent or greatly reduced. With or without vertical setae in both sexes. Tarsus I –II without omega (ω). . . . . …… 6

5-With a dorsal transverse groove dividing the propodosoma from the hysterosoma. Both males and females with undivided claw on all tarsi. Claw attached to the end of the tarsus by paired sclerites surrounded by a short, cushion-like pretarsus. Anal and tarsal suckers are usually present in the male. …… Family Acaridae

-External vertical setae (ve) arising near the anterior angles of the dorsal propodosomal shield at the same level as (vi). On genu I, sigma$_1$ (σ_1)is slightly longer than sigma$_2$ (σ_2), femur of male not enlarged, without a ventral conical process. Internal scapular setae (sci) markedly longer than external scapular setae (sce). Supracoxal setae is flattened, bearing stiff lateral projections basally ……. *Tyrophagus putrecentiae***.** (Fig.1)

-External vertical setae (ve) arising near the anterior angles of the dorsal propodosomal shield slightly posterior to the level of (vi). On genu I, sigma$_1$ (σ_1) more than three times longer than sigma$_2$ (σ_2), femur of male enlarged and bearing ventrally a conical process. Internal scapular setae (sci) slightly longer than (sce). The supracoxal setae is expanded basally and thickly pectinate …….. *Acarus siro* (Fig. 2)

6- Females and most males rounded or sac-like with striated cuticle, rarely elongate; oviporus a simple transverse slit without epigynium, anterior to coxal epimera III; male genital organ anterior to coxal epimera IV; genital suckers absent. Legs generally short and telescoped, tarsi I-IV terminate in stalked ambulacral discs or spines. .. . . . . …… …… 7

-Both sexes typicaly elongate or ovate; oviporus various, occasionally transverse, epigynium usually present, sometimes reduced, diminuitive genital suckers often present. Legs occasionally telescoped, legs I-II may be compressed as grasping structure. Tarsi I-IV with terminal or subterminal discs. 8

7-Prodorsal shield flanked by a pair of strong longitudinal apodemes, occasionally joined posteriorly by a less well developed transverse band. …. . . . . ……... . Family Knemidokoptidae.

-Idiosoma with curved striations, pig-like spines absent. In male, apodemes I fused in the midline forming a median sternum, tarsi end with long stalked sucker-like pulvilli and whip-like setae, para-anal suckers absent. In female, apodemes I concave laterally, tarsi end with claws . . . *Knemidocoptes mutans* (Fig. 3)

8-Body elongate, oviporus a longitudinal slit or slightly expanded inverted "V", without indication of genital suckers, leg IV distally inserted from leg III. . .. . ……..... 9
- Body ovat, oviporus an inverted "U", "Y" or "V" shape, sclerotized arched epigynium present or absent, genital suckers reduced, leg IV closely inserted to leg……..…….. . . . . …….…… 10
9-Legs I and II thick and short. Femur and genu I-II coalesced dorsally. Leg IV inserted on posterior portion of idiosoma, tarsi with elongate membranous pretarsal elements opisthosoma often elongate,; epigynium reduced.. . . . . ……. Family Laminosioptidae**.**
-Lateral wing-like protrusions (wp) present posterior to legs II. Solenidia sigma (σ) present on genu III, gnathosomal wing absent. Two pairs of genital setae present. Total length more than 700 μm, setae d_4 and l_4 close together ……. *Fianocoptes nizoni* (Fig. 4)
10-Gnathosoma without enveloped membranes. Genu III with solenidion sigma (σ) . . . . . ……... 11
-Gnathosoma is enveloped with membranes. Genu III without solenidion sigma (σ)... . . . Family Epidermoptidae
-Female apodemes I fused in the middle with short transverse bar. Tarsi I and II thicker than III and IV. Ambulacrum with delicate stalk and small bell-shaped pulvillus. Setae "sae" and "pa" located on a pair of humped shape. Male adanal sucker present. . . …… . . . . . *Strelkoviacarus quadratus* (Fig. 5)
-Female apodemes I fused terminally. In both sexes, tarsi I and II thicker and shorter than III- IV, with curved claw-like process directed internally. Ambulacrum with delicate stalk and trumpet-shaped pulvillus. Setae sae and pa located on tubercles. Male adanal sucker absent. . . . . …… genus *Myialges*
*Setae sce long. Apodemes I fused in a short but distinct sternum and apodemes III and IV connected by punctured bands. Tarsus I with huge apical claw-like process . . . . . ….…….. *Myialges falconis* (Fig. 6)
*Setae sce short. Apodemes I joined by a small transvers chitinous stripe, without sternum., apodemes III and IV free. Tarsus I with small apical claw-like process. . . . . …….. *M. pici* (Fig. 7)
11-Legs III and IV situated laterally. Female usually with epigynium.…… Family Analgidae
-Apodemes I sparated. Internal vertical setae (vi) only present, female with two pairs of very long terminal opisthosomal hairs. Propodosomal shield rounded apically with two wing-like process, genital sucker present. In both sexes, tibiae of legs I and II with ventrolateral apophysis. Leg III in male overpassing body end, two acute subapical spines present on tarsus III …… … …….. *Megninia cubitalis***.** (Fig. 8)
-Legs III and IV situated sublaterally. Female without epigynium. ….…… Family Dermoglyphidae
-In both sexes, body elongate, setae vi long and separated but setae ve absent. Latero-ventral setae lv present posteriorly and setae sae terminal. Apodemes I and II fused, apodemes IV an inverted V-shape. . ……. . . . . …….. *Dermoglyphus columbae*. (Fig. 9)
-In both sexes, body elongate, setae vi rudemintary and separated. Latero-ventral setae lv absent, setae sae lateral. Apodemes I and II separated, apodemes IV slightly curved. ……. *Paralges pachenemys* (Fig. 10)
12-Palpal thumb-process or palpal thump-claw distinct ……... . . . . ……... 13
-Palpal thumb process or palpal thumb-claw indistinct. …. . . . . ……. 16
13-Body setae of adults relatively few, arranged in a transverse rows. Cheliceral bases fused forming a stylophore which is fused with the rostrum, movable cheliceral digits short and stylettiform or whip-like. Palp with palpal thumb process. Genital suckers rarely present.. …….. 14
-Body setae of adult relatively numerous, not arranged in orderly rows. Cheliceral bases closely contigous or fused with each other, rarely integrated with other gnathosomal elements, movable cheliceral digits aciculat or stylettiform. Palp with one palptibial claw. Genital suckers absent. . . …… 15
14-Tarsi I-IV with claws and or empodia with tenent hairs… ……..……. . . . . ……. 17
-Tarsi I-II with claws and empodia, tarsi III-IV without claws or empodia, terminating instead in a series of long whip-like setae. Pedipalp with three short broad coarsly spiculated setae and a forked apical process. . . . . …… Family Harpyrhynchidae
-Dorsal setae quite smooth. Legs III and IV reduced to two or three segments, or to simple stumps; last segments clawless, ending in a number of long flagellae.…… *Harpyrhynchus vercammni* (Fig. 11)
15-Palpal tarsus without specialized setae, often greatly reduced; palptibial claws usually curved ventrally, sometimes greatly enlarged; palpal femora may have well developed spur-like apophyses. Male genital opening dorsal; aedeagus projecting anteriorly or posteriorly. Dorsal body setae of various shapes …….. Family Cheyletiellidae
-Male with aedeagus projecting posteriorly. Female with 1-3 dorsal shields; tarsal claws relatively small and weak; tarsi I-IV flanked by simple, split or fork-shaped setae. Peritreme with 3-5 pairs of segments. Dorsal body setae simple or serrate …….. Genus *Ornithocheyletia*
-Male idiosoma ovoid with pair of long setae terminally. Female hysterosomal shield with two pairs of serrate setae. . . . . ……. *O. canadensis* (Fig. 12)
-Male idiosoma spindle-shape without pair of long setae terminally, hysterosomal shield with three pairs of setae. Aedeagus long and curved. Female idiosoma with one pair of setae terminally, hysterosoma with lateral serrate setae …… *O. lukoschusi.* (Fig. 13)
-Female without opithosomal shield, tarsus I without dorsal protuberance …. . . . . *O. pinguis* (Fig. 14)

-Female opithosomal shield with one pair of long, simple setae, tarsus I with dorsal protuberance …….. *O. hallae* (Fig. 15)

-Female opithosomal shield without setae. Distal idiosoma with two pairs of long simple setae ……. *O. gersoni* (Fig. 16)

16-Legs I-IV similarly developed, often short without strong femoral spurs. Claws present, empodia each with two group of tenent hairs. Idiosoma with more than two pairs of well developed setae . . Family Syringophilidae

-Small elongate, worm-like mite; body divided by indistinct constriction into three main regions; peritremes well developed; dorsal setae normally long and weakly spinose; legs short and tarsi I-II with two short squamiform-like setae behind the claw, tarsi III-IV with two long feather like setae inserted medially. . . . . ……. *Syringophilus minor* (Fig. 17)

17-Ovoid or round in shape, occasionally hemispherical, eyes present. Dorsal shields absent or weakly developed. Female genital aperture longitudinal. Chelicerae short and aciculate, cheliceral bases fused to form a conical stylophore, sinuous peritreme present. Genital suckers absent. Empodia with one group of tenent hairs, tarsi I and II with one or two solenidia …… …… Family Caligonellidae

Eyes present, stylophore not elongate, without marginal lobules. Peritremes not "W" shaped, arising dorsally on middle portion of stylophore, close behind stylet bases, palpi long, with stout tibial claw and long palptarsus. Idiosoma with ill defined dorsal shield. .. ..*Molothrognathus seusius* (Fig. 18)

18-Hypostomal setae 1, 2 and 3 in linear series. Tritosternum usually partially or completely covered by the enlarged, flattened coxae I. Legs grooves and scabellum usually developed. . . . . Uropodina.

-Hypostomal setae 2 and 3 forming a transverse row posterior to hypostomal setae1. The tritosternum is usually removed from coxae I. No leg grooves or scabellum ……. Gamasina. 19

19-Genital shield rounded or pointed posteriorly, usually widely separated from triangular anal shield. 20

-Genital shield truncate or weakly convex posteriorly, sometimes abutting a broad ventrianal shield. Male with sterno-genital and a separate ventro-anal or anal shield. ……. . . . . ……. 21

20-Chelicerae elongate, edentate; corniculi membranous, usually lobate; palptrochanter often with a raised medioventral keel. Chaetotaxy of genu IV diverse but commonly with two ventral setae …….. Family: Macronyssidae

-Dorsum of idiosoma with subequal podosomal and opithosomal shield. Sternal shield narrow strip, metasternal setae absent. Genital shield rounded posteriorly, anal shield truncate anteriorly. Peritreme short. .. . . . . ……. *Pellonyssus* sp. (Fig. 19)

-Dorsum of idiosoma with holodorsal elongat shield. Sternal shield rectangular in shape, metasternal setae present. Genital shield narrow, pointed posteriorly, anal shield truncate posteriorly. Peritreme long. . . . . ……. Genus: *Ornithonyssus*

*Female with narrow dorsal shield, tapering posteriorly, dorsal setae numerous and long, reaching to or past bases of setae of next row giving mite a "hairy appearance". Sternal shield of female with three pairs of setae. . . . . …… *Ornithonyssus bacoti* (Fig. 20)

*Female with broad dorsal shield, dorsal setae few and short, reaching about half-way to bases of setae of next row. Sternal shield of female reduced with only two pairs of setae . ... *O. sylviarum* (Fig. 21)

-Chelicerae various, dentate or edentate; corniculi strongly or weakly sclerotized, never in the form of hyaline lobes; without raised medioventral keel on palptrochanter. Chaetotaxy of genu IV diverse, but commonly with one ventral setae. .. .. ……. . . . . Family: Laelapidae.

-Dorsal shield entire, with about 39 pairs of setae. Female genital shield flask-shaped with one pair of setae; peritrematal shield free posteriorly. Male with holoventral shield. Chelicerae chelate with pillus dentilis, cheliceral movable digit bidentate in female and edentate in male. . . . . ……*Androlaelaps casalis casalis*. (Fig. 22)

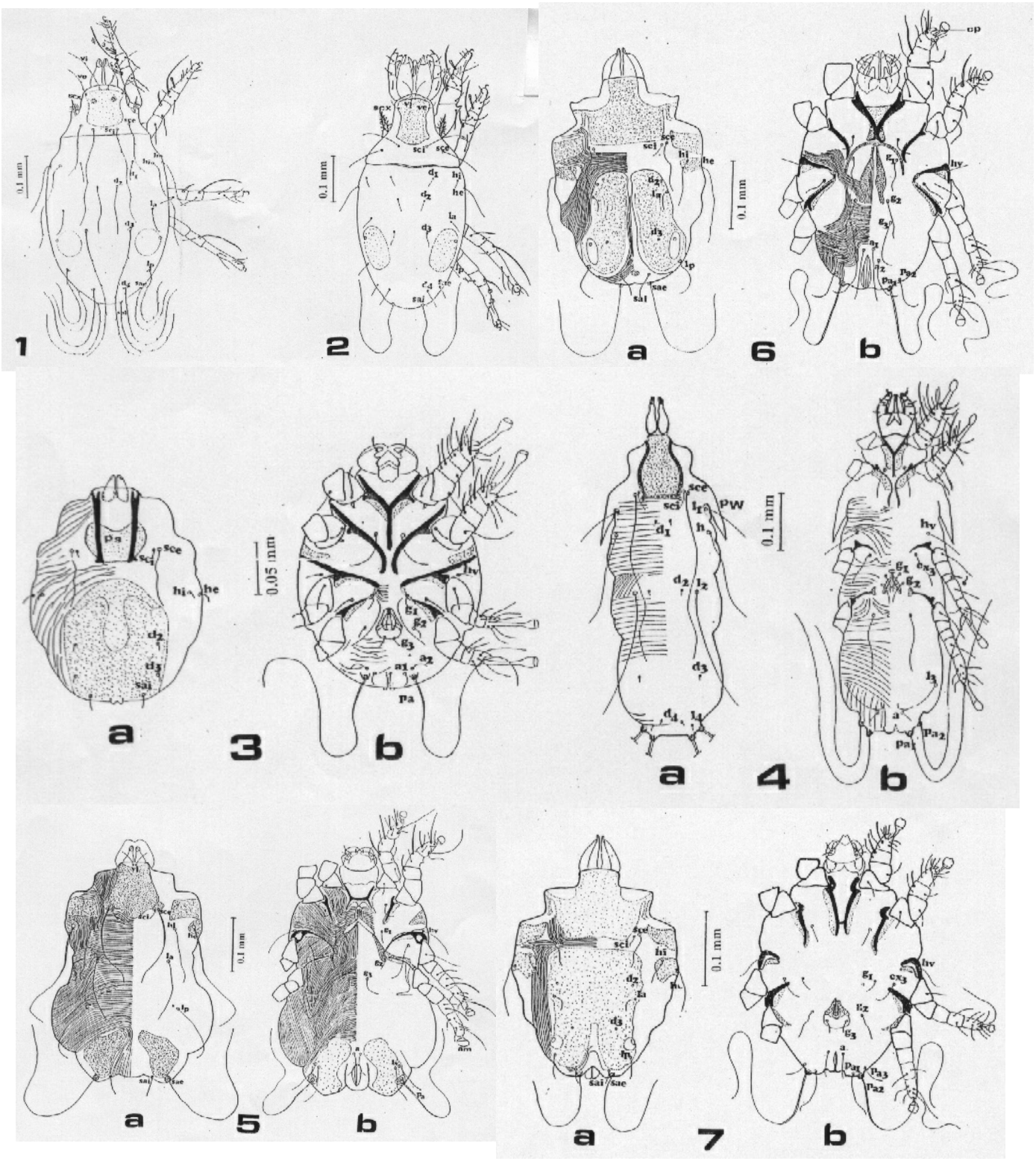
21-Adult with only two pairs of setae in the J series arising from the posterior region of the dorsal shield. Corniculi forked distally. The dorsal shield ornamented with a reticulate pattern and completely covered the dorsal surface. . . . . ……. Family: Ameroseidae.

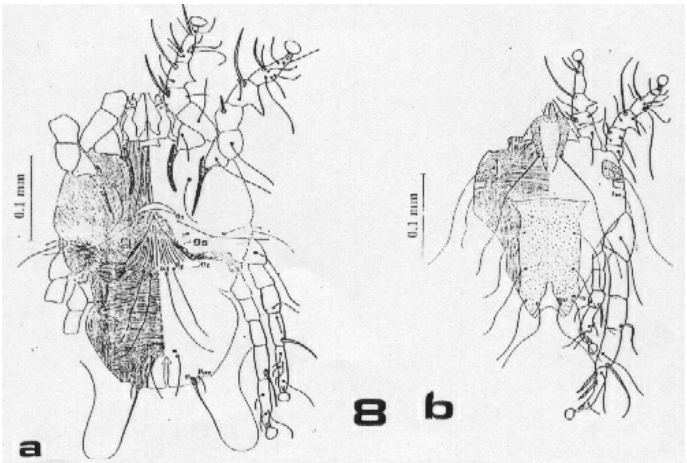
- Dorsal setae leaf-shaped with a thickened mid-rib and with slightly serrated margins. Sternal shield of female usually with a central region devoid of reticulation and with two pairs of setae. Ventroanal shield with two pairs of pre-anal setae …….. K*leemannia plumosus.* (Fig. 23)

-Adult with five pairs of setae in the J series arising from the posterior region of the dorsal shield. Corniculi not forked distally. The dorsal shield unreticulate and partially covers the dorsal surface .. . . . . Family Ascidae

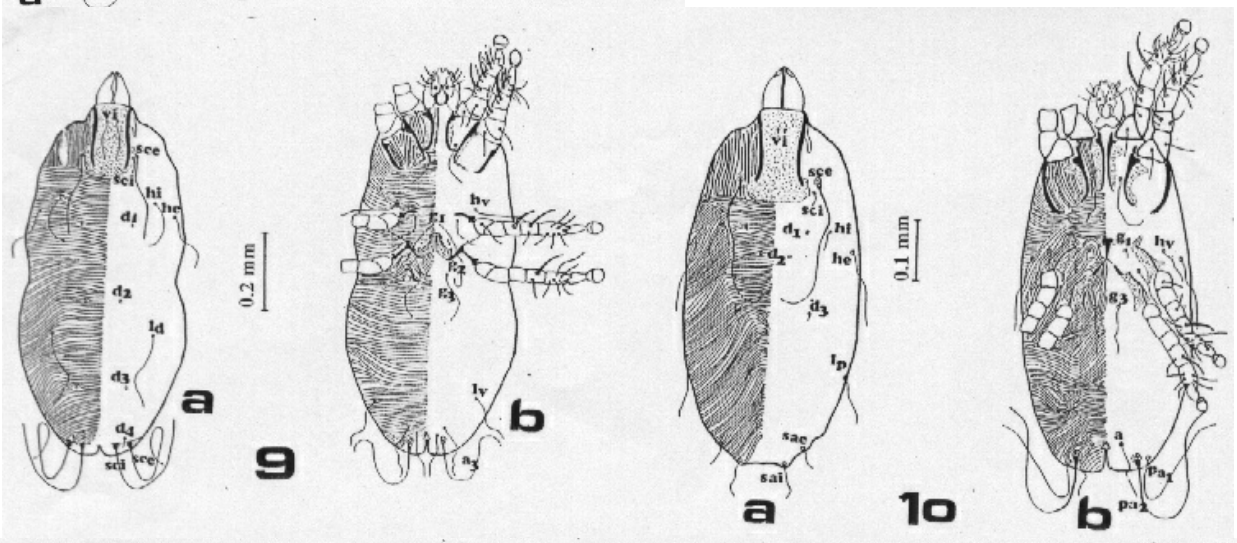
-Dorsal shield in both sexes with entire lateral margins. Marginal series of setae (R) arising from lateral interscutal membrane. Female with a ventro-anal shield bearing two pairs of setae in addation to the anals. Peritreme reduced, reaching to the posterior margin of coxa II. Peritrematal and expodal shield touching in the region of coxae IV. Fixed digit of the chelicera considerably shorter than the movable, without teeth. Pilus dentilis relatively long. .. . . . . ……. *Blattisocius tarsalis.* (Fig. 24)

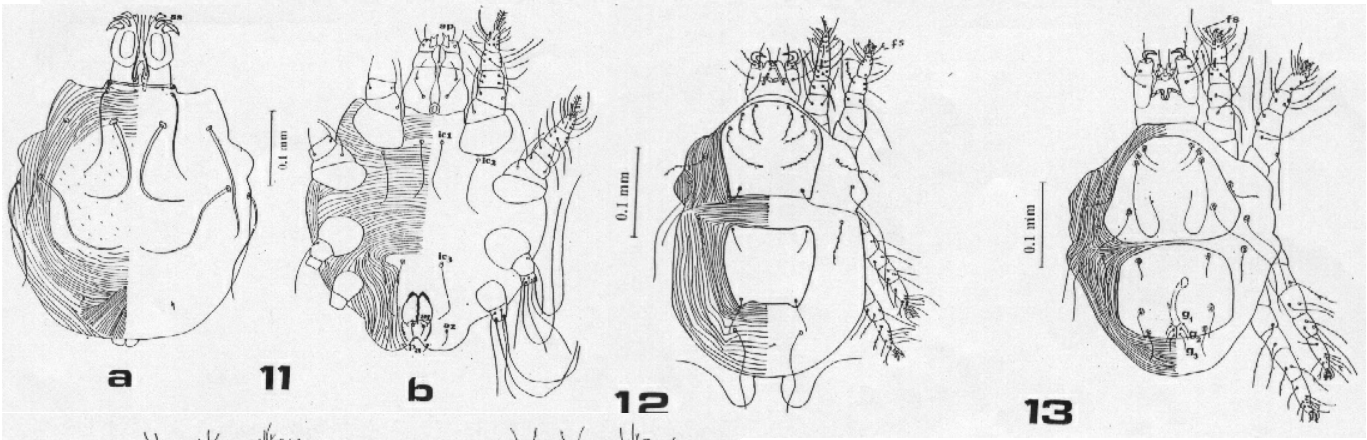
Fig.(1): *Tyrophagus putrescentiae*, female. Dorsal view.
Fig.(2): *Acarus siro,* male. Dorsal view.
Fig.(3): *Knemidocoptes mutans*, male a)Dorsal view. b)Ventral view.
Fig.(4): *Fianocoptis nizoni,* female a)Dorsal view. b)Ventral view.
Fig.(5): *Strelkoviacarus qudratus,* female a)Dorsal view. b)Ventral view.
Fig.(6): *Myialges falconies,* female a)Dorsal view. b)Ventral view.
Fig.(7): *Myialges pici,* male a)Dorsal view. b)Ventral view.
Fig.(8): *Megninia cubitalis,* a)female Ventral view. b)Male Dorsal view.
Fig.(9): *Dermoglyphus columbae,* female a)Dorsal view. b)Ventral view.
Fig.(10): *Paralges pachenemys,* female a)Dorsal view. b)Ventral view.





Abbreviations for figures 1- 10: Anal setae (a_1-a_2), ampulacrum (am.), claw process (c.p.), dorsal setae (d_1-d_4), genital setae (g_1-g_2), internal, external & ventral humeral setae (hi, he & hv), antero-, postero- & ventr-lateral setae (la, lp & lv), postanal satae (Pa1-Pa3), internal & external sacral setae (Sai & Sae), internal & external scapular setae (Sci & Sce), supracoxal setae (Scx), internal & external vertical setae (vi & ve), propodosomal shield (P.s.), genital sucker (g.s.).





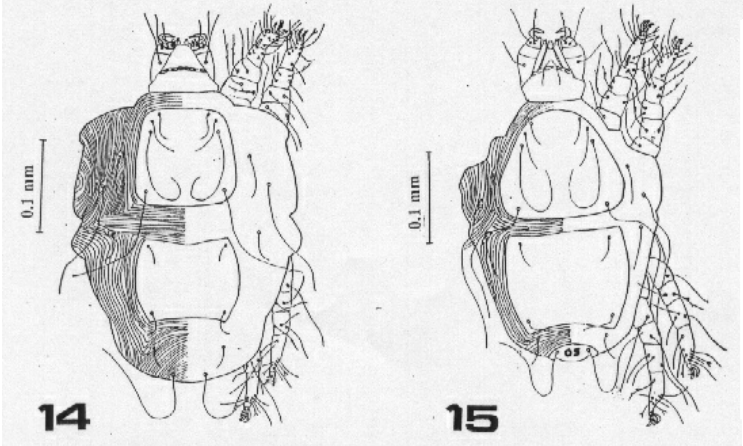
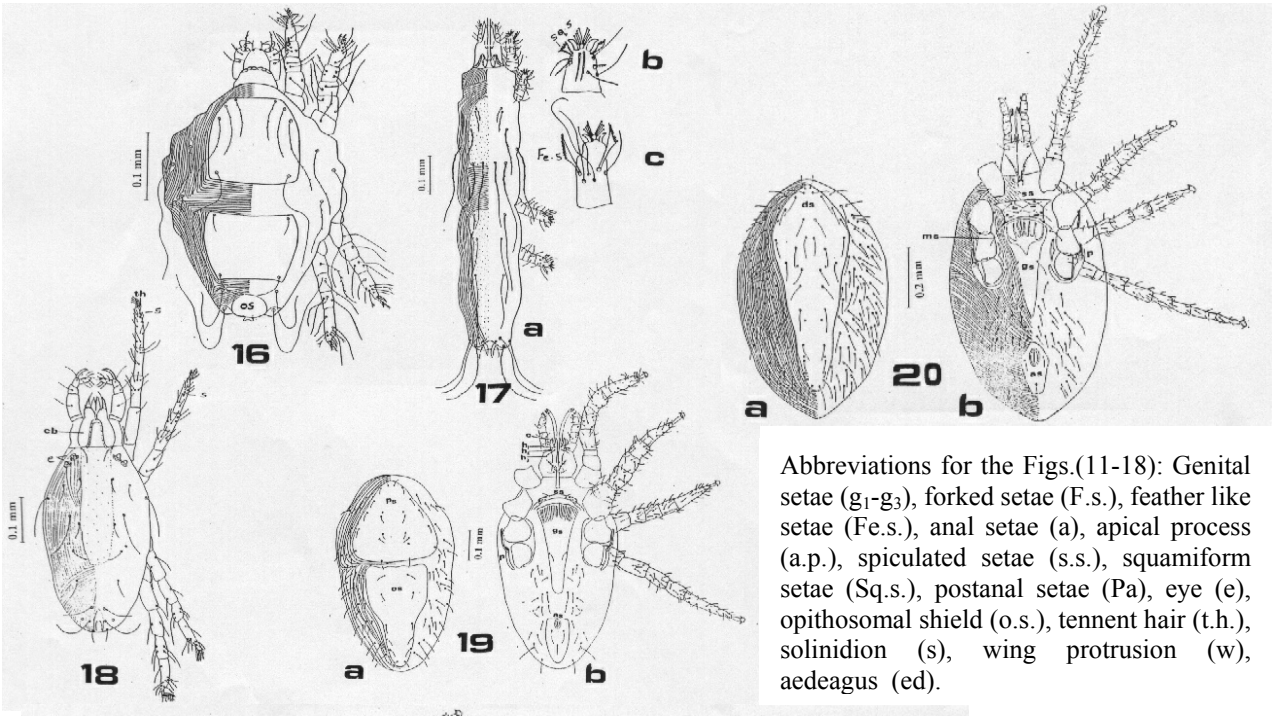


Fig.(11): *Harpyrhynchus vercammni,* female a)Dorsal view. b)Ventral view.
Fig.(12): *Ornithocheyletia canadensis,* male. Dorsal view.
Fig.(13): *O. lukoschusi,* male. Dorsal view.
Fig.(14): *O.pinguis,* female. Dorsal view.
Fig.(15): *O. hallae,* female. Dorsal view.
Fig.(16): *O.gersoni,* female. Dorsal view.
Fig.(17): *Syringophilus minor,* female a)Dorsal view. b)Tarsus I. c)Tarsus III.
Fig.(18): *Molothrognathus seusius,* female. Dorsal view.



Abbreviations for the Figs.(11-18): Genital setae (g_1-g_3), forked setae (F.s.), feather like setae (Fe.s.), anal setae (a), apical process (a.p.), spiculated setae (s.s.), squamiform setae (Sq.s.), postanal setae (Pa), eye (e), opithosomal shield (o.s.), tennent hair (t.h.), solinidion (s), wing protrusion (w), aedeagus (ed).

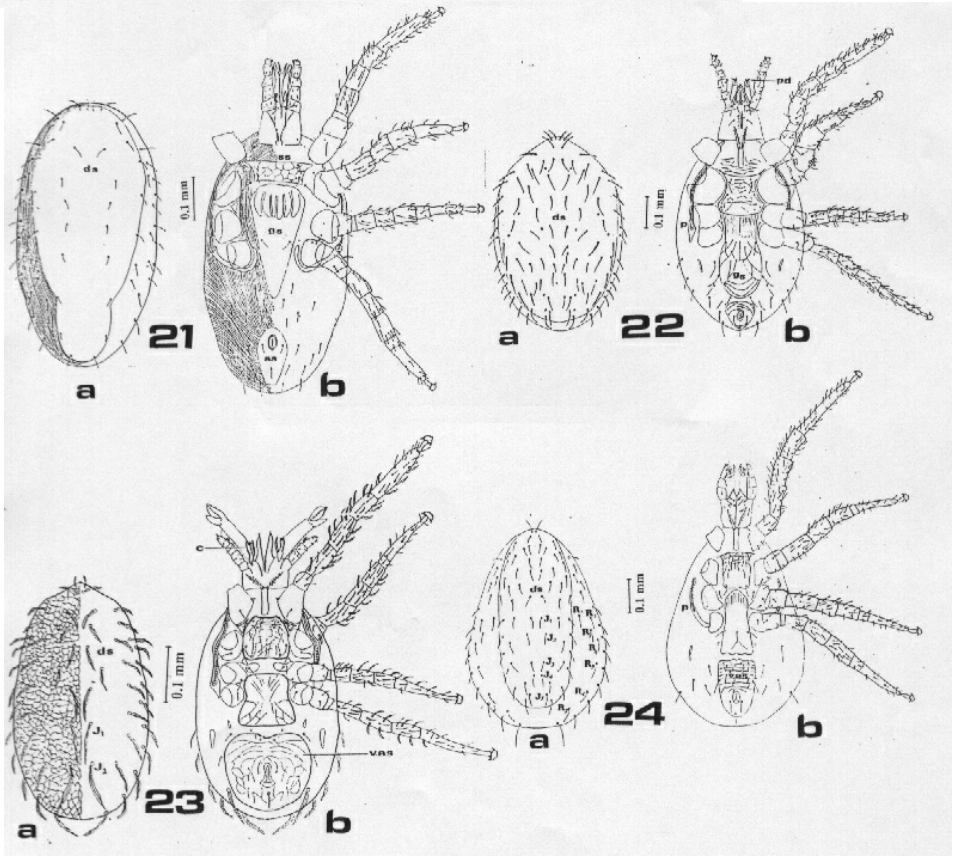


Fig.(19): *Pellonyssus sp.,* female. a)Dorsal view. b)Ventral view.
Fig.(20): *Ornithonyssus bacoti,* female a)Dorsal view. b)Ventral view.
Fig.(21): *O. sylviarum,* female a) Dorsal view. b)Ventral view.
Fig.(22): *Androlaelaps casalis casalis,* female. a) Dorsal view. b)Ventral view.
Fig.(23): *Kleemannia plemosus,* female a)Dorsal view. b)Ventral view.
Fig.(24): *Blattisocius tarsalis,* female a)Dorsal view. b)Ventral view.
Abbreviations: (Figs: 19-24): Anal shield (a.s.), corniculi (c), dorsal shield (d.s.), genital shield (g.s.), hypostamal setae (h_1-h_3), median setae (J) , opithosomal shield (o.s.), metasternal setae (m.s.), peritrum (p.), pillus dentils (p.d.), propodosomal shield (p.s.), marginal setae (R_1-R_7), sternal shield(s.s.), ventrianal shield (v.a s)

DISCUSSION

The extensive survey for mite fauna of the chosen wild and domestic birds revealed that all the examined birds were found to be infested. The fluctuation in infestation rates among both groups of birds and within each group was probably due to their different habits such as flying, movement, feeding, breeding, nesting, activity and apt to groom and preen. Considering the type of mites association with birds and according to Zumpt (1961) and Krantz (1978), the detected mites were grouped into parasitic and non-parasitic groups. The parasitic group included feather mites, skin mites and haematophagous mites. The non-parasitic one included storage mites, predators and mycophagous mites.

Concerning the incidence of these groups of mites on the examined birds, the data revealed that the feather mites, *Dermoglyphus columbae* and *Paralges pachenemys* (Dermoglyphidae) were the most abundant and prevalent ones on palm dove and all the domestic birds. By contrast, the other feather mite species of families Harpyrhynchidae and Analgidae were only found on palm dove, while the syringophilid species was detected on house sparrow. The harpyrhynchid, *Harpyrhynchus vercammni*, was found on the vane surface of the body feather, while those of the other families were mainly isolated from quills of wing and tail feathers. Similarly, most of the skin mites were recorded on wild birds, where members of families Epidermoptidae and Knemidokoptidae were isolated from house sparrow, but the laminosioptid mite was recovered from palm dove. However, the cheyletiellid mites were relatively common, infesting some domestic and wild birds. Of these skin mites, *Strelkoviacarus quadratus* (Epidermoptidae) was the most abundant and prevalent one and Knemidokoptes *mutanus* (Knemidokoptidae) was isolated from the unfeathered portion of the host's legs, while the other skin mites were found on different areas of the bird's body. The haematophagous mites species of family Macronyssidae were mainly detected on chickens, of these species *Ornithonyssus bacoti* was the most abundant one. These findings agree with those of several authors in Egypt, although they recorded other dermoglyphid, harpyrhynchid, epidermoptid, cheyletiellid and macronyssid species on wild, domestic and migratory birds (Rakha 1980; Mohammed & Rakha 1980; El-Bishlawy & Oyoun 1989; Abd-Alla 1993; Mohamed 1994; Mazyad *et al.* 1999 and Morsy *et al.* 1999).

The transmission of these parasitic mites to uninfested birds presumably occurs as a result of direct contact with the infested birds and their surrounding and also through air borne spread. Of the non-parasitic group of mites, the storage mites *Tyrophagus putrescentiae* (Acaridae) was the most common and abundant one. It was previously isolated from domestic and wild birds and their nests (Abd-Alla 1993; Mohamed 1994; Morsy *et al.* 1999) and also from house dust and stored food in Egypt (Shoker 1989; Shoker *et al.* 1995; Shoker & Abu El-Hussien 1998). The other detected mites of this group have been recorded as predators of mites and insects (Laelapidae and Ascidae) and as mycophagous mites (Caligonellidae and Ameroseiidae) "Hughes (1976) and Krantz (1978)". The abnormal occurrence of these non-parasitic mites on the examined birds is probably due to contamination with nest materials, infested grains that birds feed on or soil that contains some storage mites. According to Bilgrami (1994), *Tyrophagus putrescentiae* were recorded as feeders on a variaty of plant soil nematodes.

Concerning the pathogenic effect of the parasitic mites, the quill mites feed on the soft vascular living tissues of the feather shaft, causing damage, maleformation and loss of feather, in addition to a disheveled appearance and pruritus (Baker 1996; Rosskoph & Woerpel 1996; Harper 1999). On the other hand, the skin mite of family Knemidokoptidae (*K. mutanus*) bore tunnels into the epithelium, causing the scaly-leg disease, while the Laminosioptid species (*Fianocoptes nizoni*) reaches to subcutaneous layer, forming nodular lesions around the

encapsulated mites in the tissues. The other skin mites of family Cheyletiellidae feed on the keratin layer of the epidermis' causing superficial mange while those of family Epidermoptidae infest the epidermal layer, causing pityriasis (Prins *et al.* 1996 and Arends 1997). Moreover, the haematophagous mite, *O. sylviarum* has been recorded as a serious pest of poultry and wild birds in many parts of the world, causing reduction in egg production in addition to thickened crusty skin and blackened feathers around the vent (Arends 1997; Harris *et al.* 2000).

It is noteworthy to mention that the present results revealed a degree of host specificity, where 14 parasitic mites species, each was found on one host bird, while the other species were collected from two or more of the examined hosts. Moreover, most of the parasitic mites species were detected on the wild birds. This specificity is probably related to some parasite's habits or to the host birds itself that constitutes the suitable microhabitat in which the mite can survive and breed, such as skin temperature, humidity and feather structure. According to the available literature, eleven species detected in the present study have not been recorded before on birds in Egypt. These mite species are *Paralegs pachenemes* (Dermoglyphidae), *Harpyrhynchus vercammni* (Harpyrhynchidae), *Myialegs falconis* and *M. pici* (Epidermoptidae), *Ornithocheyletia gersoni*, *O. hallae*, *O. lukoschusi*, *O. pinguis*, *O. canadensis* (Cheyletiellidae), *Ornithonyssus bacoti* and *O. sylviarum* (Macronyssidae).

Finally, from the forgoing study it can be concluded that wild and domestic birds play an important role as active vectors for dispersion and spreading of parasitic mites. Hence, much more work would be necessary in order to construct an ecological map of mite distribution allover Egypt and to describe a specific way for control such parasitic group of mites that threatens birds' life and productivity.

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الملخص العربى

الحلم المصاحب لبعض الطيور في محافظة المنيا ـ مصر العليا

نجبية إبراهيم شقير ، ناجي صادق توفيق ، محمد حسن إبراهيم وإيمان صفوت عثمان
قسم علم الحيوان- كلية العلوم- جامعة المنيا- المنيا - مصر

تم إجراء هذه الدراسة لمدة ثلاث أعوام (1995-1998) لإلقاء الضوء علي الحلم المصاحب لبعض الطيور البرية والمنزلية الشائعة في محافظة المنيا والتي لها علاقة بالإنسان أملا في تمهيد الطريق للقضاء علي هذه المجموعة المتطفلة والتي تهدد حياة الطيور وتكاثرها. وقد أسفرت الدراسة عن وجود 24 نوعاً من الحلم تنتمي إلى 14 فصيلة وثلاثة رتيبات، وهي عديمة الثغور ، أمامية الثغور ومتوسطة الثغور.

وقد تضمنت مجموعة الحلم المتطفلة التي تم تعريفها : حلم الريش والذي ينتمي للفصائل درموجليفيدي ، انالجيدي ، هاربيرينكدي وسيرنجوفيلادي، وحلم الجلد الذي ينتمي للفصائل ابدرموبتدي ، كنميدوكوبتدي ، لامينوسيبوبتدي وكيلتيدي، وأيضا الحلم المتغذي علي الدم والذي ينتمي لفصيلة ماكرونسيدي. ولقد وجدت هذه الأنواع علي الطيور المصابة بمعدلات متفاوتة من الوفرة والكثافة. كما وجد آن حلم *بارالجس باكينامز ودرموجليفس كولمبي* هما الأكثر تكرارا ووفرة علي كل من الطيور البرية والمنزلية. وقد تم حصر أعداد قليلة نسبيا من أنواع أخرى من الحلم غير الطفيلي. كما اتضح آن الطيور البرية تأوي اكثر أنواع الحلم الطفيلي مقارنة بالطيور المنزلية. ومن مجموع ما وجد من أنواع الحلم ، تم تسجيل 11 نوعا لأول مرة علي الطيور في مصر. كما تم عمل مفتاح تصنيفي موضحا بالرسم للأنواع التي تم حصرها في هذه الدراسة

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Table 1: Infestation rate of the examined birds with mites.

Birds	Wild birds				Domestic birds				
	Streptopelia senegalensis aegyptiaca	*Passer domesticus niloticus*	*Ardeola ibis ibis*	Total	*Anser anser*	*Anas platyrhynchos platyrhynchos*	*Gallus gallus domesticus*	*Columba livia domestica*	Total
Examined	100	100	80	280	20	22	53	120	215
Infested	72	36	11	119	14	15	24	39	92
%	72%	36%	14%	42%	70%	68%	45%	32%	43%

Table (2): Incidence of mite species on the examined birds.

Host	Mite species	Prevalence		Intensity of infestation		Total	Relative abundance %
		No. infested	%	Mean ±SD	range		
Palm dove (*Streptopelia senegalensis aegyptiaca*) n=72	*Dermoglyphus columbae.*	9	68.1	4.67±4.98	1-25	310	76.5
	Paralegs pachenemys.	49	15.3	1.45±0.52	1-2	20	4.9
	Harpyrhynchus vercammni.	8	11.1	3.13±2.47	1-8	25	6.2
	O. hallae.	6	8.3	1±0	--	6	0.2
	Tyrophagus putrescentiae	5	6.9	1.40±0.89	1-3	8	2
	Fianocoptes nizoni.	4	5.6	1.5±1	1-3	6	1.5
	Megninia cubitalis.	3	4.2	8.33±5.03	1-13	25	6.2
	Ornithocheyletia gersoni.	2	2.8	1±0	--	2	0.5
	O. pinguis.	2	2.8	1±0	--	2	1.5
	O. lukoschusi.	1	1.4	1±0	--	1	
						405	
House sparrow (*Passer domesticus niloticus*) n=36	*Syringophilus minor.*	16	44.4	6.69±8.91	1-31	107	60.1
	Strelkoviacarus quadratus.	13	36.1	2.23±2.98	1-9	42	23.6
	Ornithocheyletia gersoni.	9	25	1.6±0.52	1-2	14	7.9
	Myialges pici.	4	11.1	1.25±0.5	1-2	5	2.8
	Knemidokoptes mutanus.	3	8.3	1±0	--	3	1.7
	Myialges falconis.	2	5.6	1.5±0.707	1-2	3	1.7
	Pellonyssus sp.	2	5.6	1.5±0.707	1-2	3	1.7
	O. canadensis.	1	2.8	1±0	--	1	0.6
						178	

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Buff-backed heron	*Tyrophagus putrescentiae*	8	72.7	1.25±0.5	1-2	16	76.2
(*Ardeola ibis ibis*)	*Molothrognathus seusius.*	2	18.2	1±0	--	2	9.5
	Blattisocius tarsalis.	1	9.1	1±0	--	1	4.8
n=11	*Kleemannia plumosus.*	1	9.1	1±0	--	1	4.8
	Androlaelaps casalis casalis	1	9.1	1±0	--	1	4.8
Chicken	*Dermoglyphus columbae*	11	45.8	3±0.77	2-4	33	31.4
(*Gallus g. domesticus*)	*Paralegs pachenemys*	11	45.8	2.73±0.79	2-4	30	28.6
	Tyrophagus putrescentiae	10	45.8	2.55±1.12	1-4	28	26.7
n=24	*Ornithonyssus bacoti*	6	25	1.83±0.98	1-3	11	10.5
	Ornithonyssus sylviarum	2	8.3	1.5±0.70	1-2	3	2.9
						105	
Pigeon	*Dermoglyphus columbae*	25	64.1	1.37±0.49	1-2	33	45.8
(*Columba livia domestica*)	*Paralegs pachenemys*	10	25.6	3.1±1.37	1-5	31	43.1
	Tyrophagus putrescentiae	5	12.8	1.4±0.54	1-2	7	9.7
n=39	*Ornithocheyletia hallae*	1	2.6	1±0	--	1	1.4
						72	
Geese	*Paralegs pachenemys*	10	71.4	14.5±9.96	1-36	145	87.9
(*Anser anser*)	*Tyrophagus putrescentiae*	4	28.6	4±2.45	1-7	16	9.7
	Acarus siro.	2	14.3	1.5±0.71	1-2	2	1.2
n=14	*Kleemannia plumosus*	2	14.3	1.5±0.71	1-2	2	1.2
						165	
Duck	Paralegs pachenemys	15	100	14.4±23.51	1-39	216	100
(*Anas platyrhynchos*)							
n=15							
						216	