Journal of the Egyptian Society of Parasitology, Vol.44, No.1, April 2014
J. Egypt. Soc. Parasitol. (JESP), 44(1), 2014: 25 - 32

REDISCOVERY OF *MERISTASPIS LATERALIS* (KOLENATI) (ACARI: MESOSTIGMATA: SPINTURNICIDAE) PARASITIZING THE EGYPTIAN FRUIT BAT, *ROUSETTUS AEGYPTIACUS* (GEOFFROY) (MAMMALIA: CHIROPTERA), WITH A KEY TO MITES OF BATS IN EGYPT

By

MOHAMED W. NEGM and MAHMOUD M. FAKEER

Department of Plant Protection, Faculty of Agriculture, Assiut University, Assiut 71526, Egypt. Correspondence: Dr. Mohamed W. Negm, email: waleednegm@yahoo.com

Abstract

Faunistic information about bat mites in Egypt is scarce. Collection records of parasitic mites, *Meristaspis lateralis* (Kolenati, 1856) (Mesostigmata: Spinturnicidae), are reported from the Egyptian fruit bat, *Rousettus aegyptiacus* (Geoffroy, 1810) (Mammalia: Chiroptera) in Assiut Governorate, Egypt. Seven species of bat mites are recognized from Egypt to date. A host-parasite checklist and an identification key to these species are presented.

Key words: Acari, mites, key, bats, Chiroptera, Egypt

Introduction

The Egyptian fruit bats, *Rousettus aegyptiacus* (Geoffroy, 1810) (Mammalia: Chiroptera) are widely distributed frugivores, prefer feeding on ripe tissues and juices of fruits of different crops. Because of consuming large amounts of fruit, about 50 to 150% of total body mass each night, *R. aegyptiacus* is considered a hazard to crops during growing season (Fujita and Tuttle, 1991; Kwiecinski and Griffiths, 1999).

Bats can be infested with various mite groups. Mites of the family Spinturnicidae and many species of Macronyssidae are exclusive parasites of bats during their all life stages (Krantz and Walter, 2009). They feed as obligate ecto-parasites on the blood or lymph of their hosts (Baker and Craven, 2003). Rudnick (1960) and Radovsky (1967) provided taxonomic reviews about mites of families Spinturnicidae and Macronyssidae, respectively.

This paper presents a host-parasite checklist and a key to mite species collected from bats in Egypt to date, on which to build further information of this fauna.

Materials and Methods

The Egyptian fruit bat, *R. aegyptiacus* (Geoffroy, 1810) (Mammalia: Chiroptera) was observed at night hanging on a tree of white mulberry, *Morus alba* L. (Moraceae) and was collected by shooting. Mites were collected by visual examination under a stereoscopic microscope (VisionScope 2, ken-*a*-vision®, USA) from the internal side of wing membranes and sporadically the tail membrane with the help of a fine brush. The mite specimens were cleared in lactic acid, mounted in Hoyer's medium, dried on a hot plate, ringed with nail polish and studied under a research microscope (CxL, Labomed®, USA). The voucher slide-mounted samples were deposited in the Acarology Museum, Plant Protection Department, Faculty of Agriculture, Assiut University, Egypt.

Results

Seven species of Mesostigmata, classified in two families and four genera, are reported from bats in Egypt to date (Table 1).

The collection records (nine females and six males) of *Meristaspis lateralis* (Kolenati, 1856) (Mesostigmata: Spinturnicidae) are rediscovered parasitizing *R. aegyptiacus* in the agricultural farm of Assiut University, Assiut Governorate, Egypt.

Table 1: Checklist of mite species so far reported from bats in Egypt.

Family	Species	Host	Host family	Reference
Macrony-ssidae	*Steatonyssus longipes* Radovsky and Yunker	*Nycteris thebaica* Geoffroy	Nycteridae	Radovsky and Yunker, 1963
	S. murinus (Lucas)*	*Pipistrellus kuhlii*	Vespertilionidae	Keegan, 1956
Spinturn-icidae	*Ancystropus aethiopicus* Hirst	*Rousettus aegyptiacus* (Geoffroy)	Pteropodidae	Hafez *et al*., 1994
	A. zeleborii Kolenati	*Rhinopoma microphyllum*	Rhinopomatidae	Kolenati, 1856
		Ro. aegyptiacus	Pteropodidae	Kolenati, 1856, 1860
	Meristaspis kenyaensis (Radford)	*Ro. aegyptiacus*	Pteropodidae	Hafez *et al*., 1994
	M. lateralis (Kolenati)	*Ro. aegyptiacus*	Pteropodidae	Kolenati, 1856; present study
	Paraperiglischrus rhinolophinus (C.L. Koch)	*Rhinolophus clivosus* Cretzschmar	Rhinolophidae	Kolenati, 1859

*Type material of *Steatonyssus murinus* neither available nor original description clear enough for accurate identification. Till and Evans (1964) considered it as a species *incertae sedis*, while Radovsky (1967) treated it as a *nomen dubium*.

Discussion

Bats (Chiroptera) are the most abundant species of mammals and have a worldwide distribution. They inhabit a wide range of ecosystems and are known for their ecological importance as seed dispersers, pollinators and insectivores.

In Egypt, the mite fauna reported in the association with bats is very limited. Only seven species, classified in two families and four genera, were reported. Hafez *et al*. (1994) reported four species of the Spin-turnicidae collected from bats in Qualyoubia Governorate, two of which, *Ancystropus aethiopicus* Hirst, 1923 and *Meristaspis kenyaensis* (Radford, 1947), were considered as new records.

On the other hand, Egyptian bats were incriminated to have a zoonotic role in leishmaniasis as antibodies were detected in seven bats (Morsy *et al*., 1987b). Besides, *Trypanosoma vespertilionis* (Battaglia, 1904) was reported from Egyptian bats (Morsy *et al*., 1986), and bat bug *Cimex pipistrelli* from bat roosts was the vector of *Schizotrypanum T.* (*S.*) *dionisii* and *T.* (*S.*) *vespertilionis* in British bats (Gardner and Molyneux, 1988). *Nycteria medusiformis* Garnham and Heisch, 1953 is a malaria parasite of the Egyptian insectivorous bat, *Taphozous perforatus* (Morsy *et al*., 1987a). Korine *et al.* (2012) detected *Xenopsylla ramesis*, a plague vector flea on frugivorous Egyptian fruit bat (*Rousettus aegyptiacus*). Also, *R. aegyptiacus*, is currently considered as a potential reservoir host for Marburg hemorrhagic virus (Paweska *et al*, 2012). Nakamura *et al*. (2013) described an outbreak of yersiniosis in *R. aegyptiacus* caused by *Yersinia pseudotuberculosis* serotype 4b.

Conclusion

The outcome results showed that the Egyptian fruit bats were infested with seven species of mites. Besides, the detection of zoonotic parasites increased their importance as reservoir hosts. Bats and their parasites are increasingly investigated for their role in maintenance and transmission of the potentially emerging pathogens. This must be in consideration of the Egyptian Scientific Authorities.

Acknowledgment

The authors would like to thank Amr Gnaidy and Mohammed A. Negm for hunting bats. For the authorization to use figures, the authors also acknowledge Dr. G.W. Krantz, Oregon State University, Oregon, USA, and the University of California Press.

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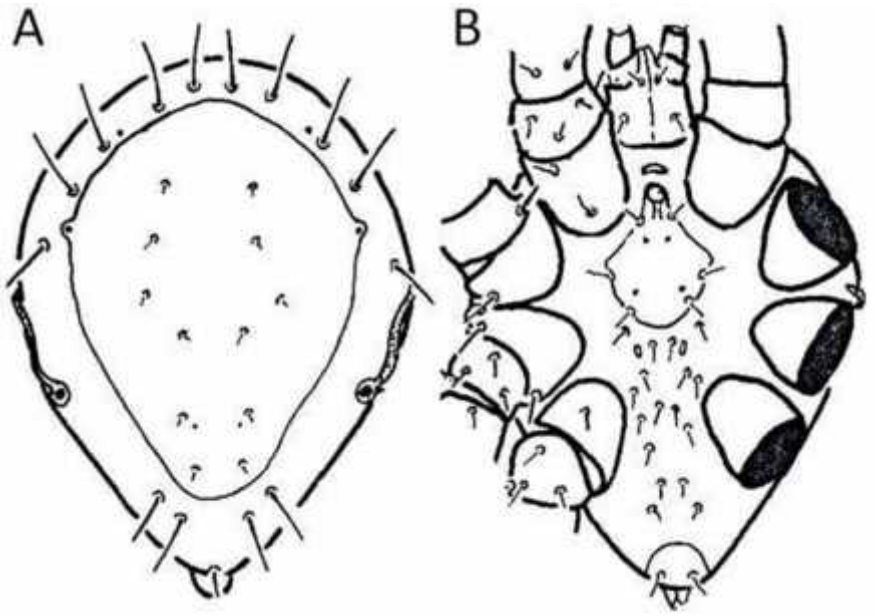

Figure 1: Family Spinturnicidae Oudemans, 1902. A, male dorsum, B, male venter (Krantz, 1978)

Figure 2: Family Macronyssidae Oudemans, 1936. Female venter (Krantz, 1978)

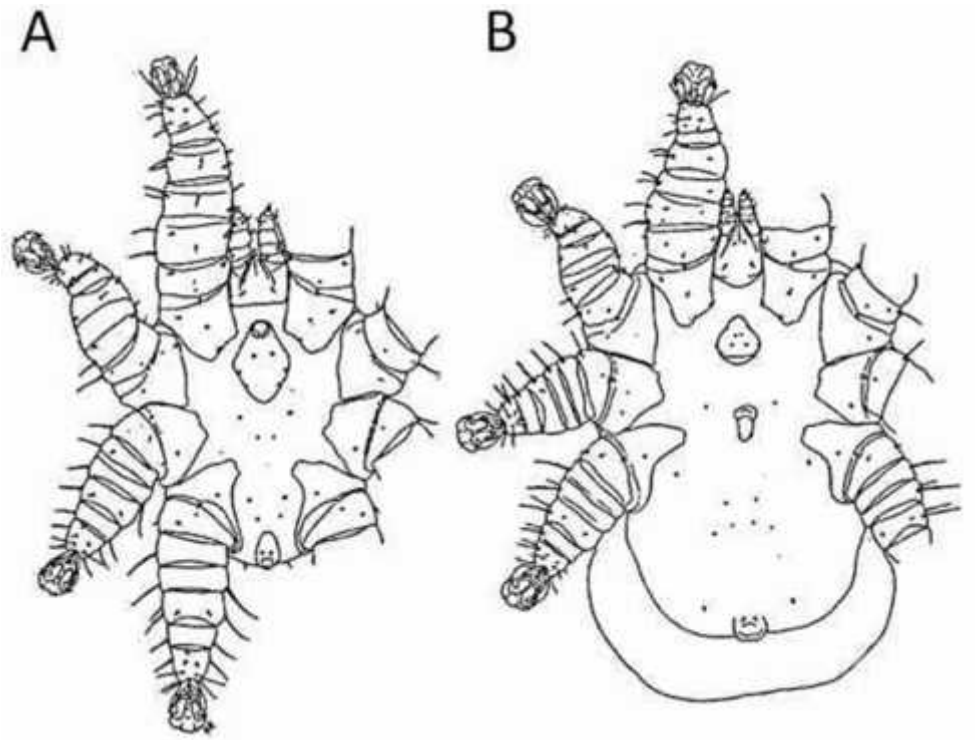

Figure 3: *Paraperiglischrus rhinolophinus* (C.L. Koch, 1841). A, male venter, B, female venter (Rudnick, 1960)

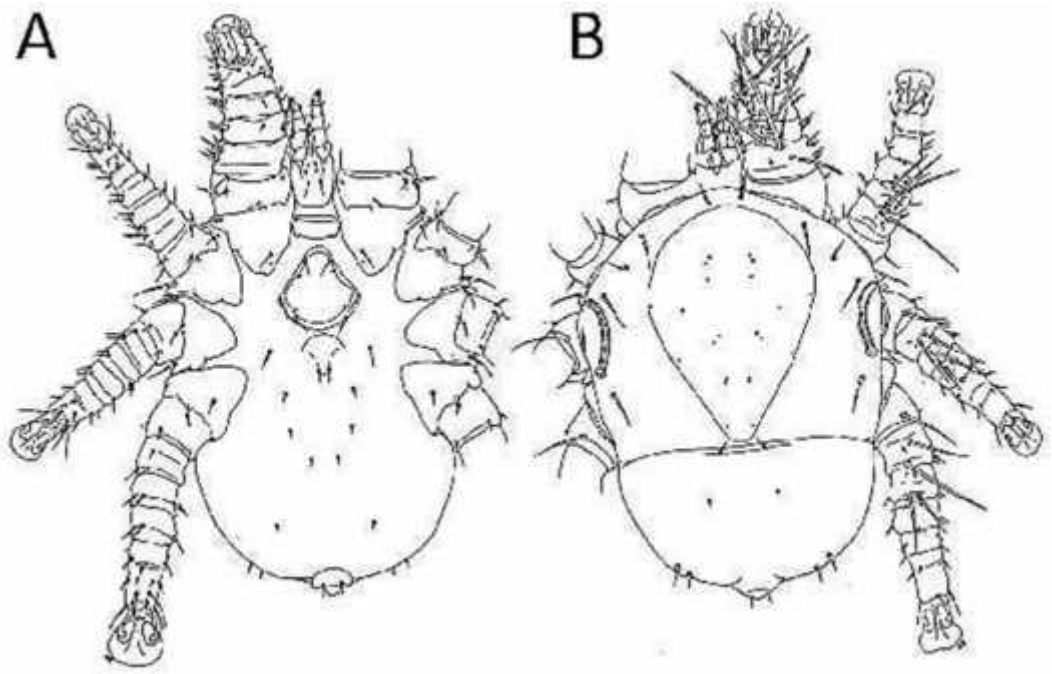

Figure 4: *Meristaspis lateralis* (Kolenati, 1856). A, female venter, B, female dorsum (Rudnick, 1960)

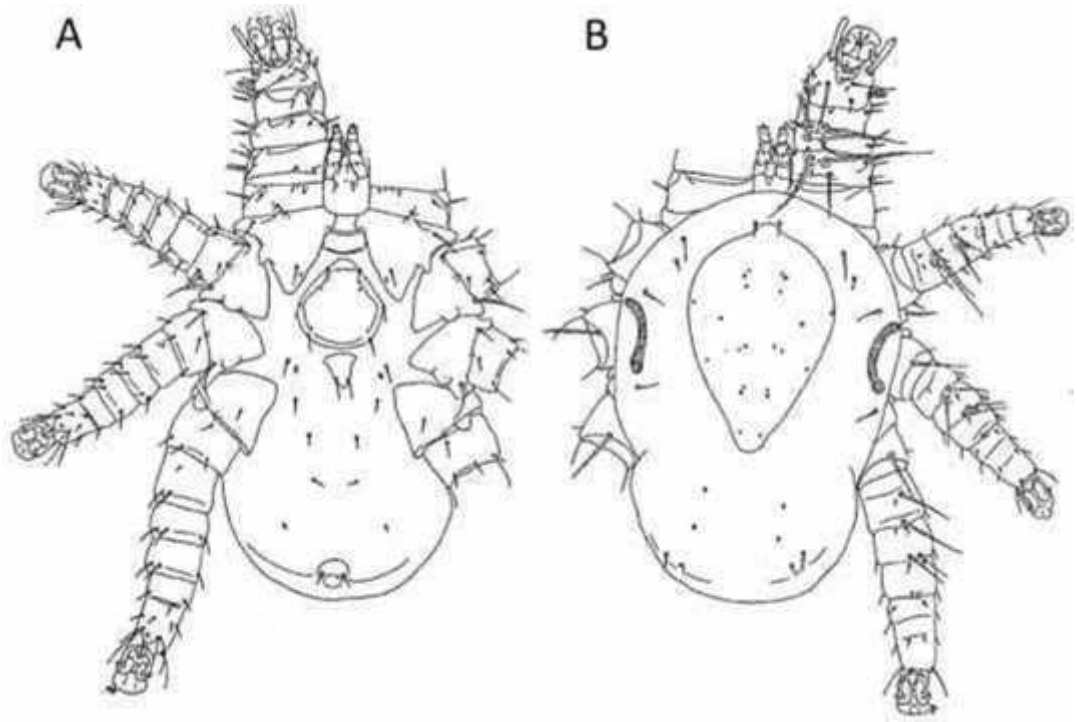

Figure 5: *Meristaspis kenyaensis* (Radford, 1947). A, female venter, B, female dorsum (Rudnick, 1960)

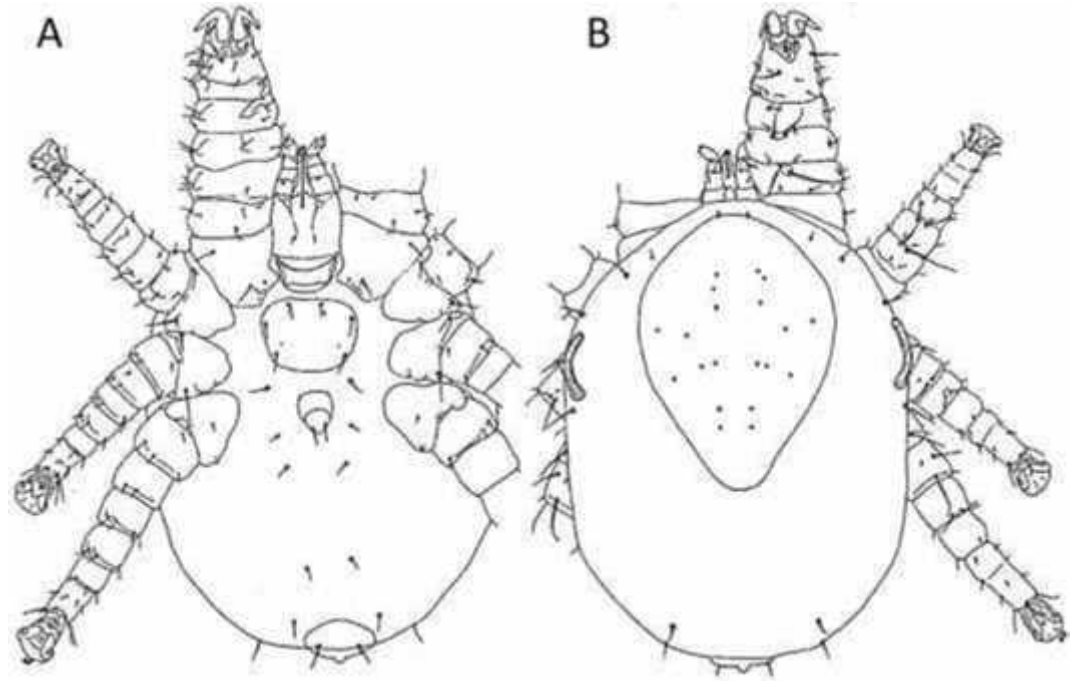

Figure 6: *Ancystropus aethiopicus* Hirst, 1923. A, female venter, B, female dorsum (Rudnick, 1960)

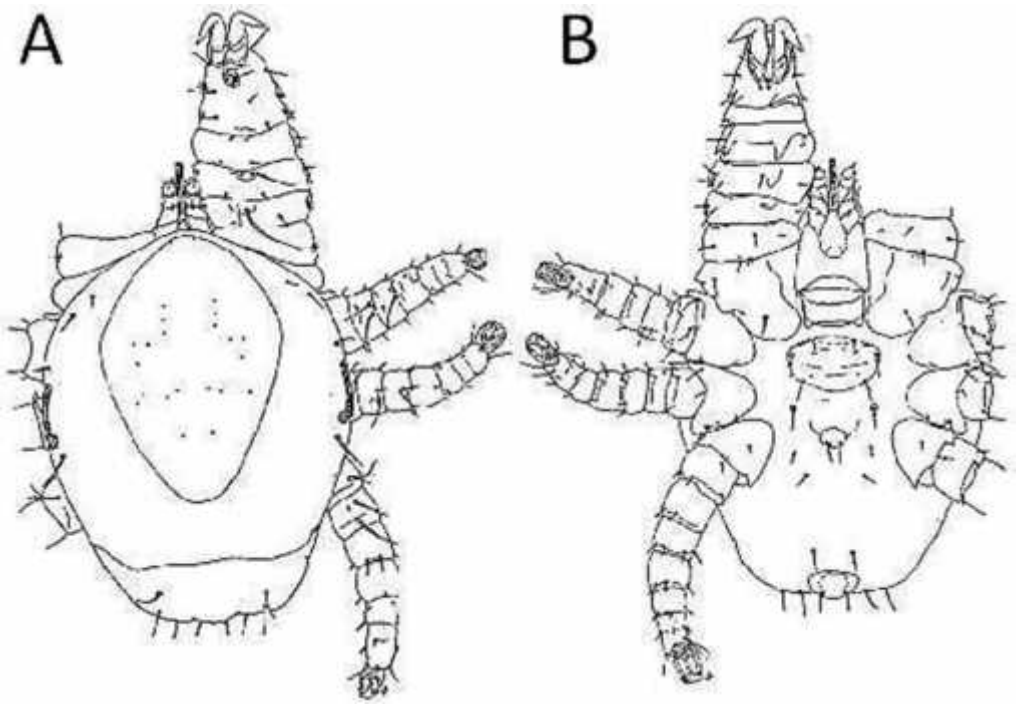

Figure 7: *Ancystropus zeleborii* Kolenati, 1856. A, female dorsum, B, female venter (Rudnick, 1960)

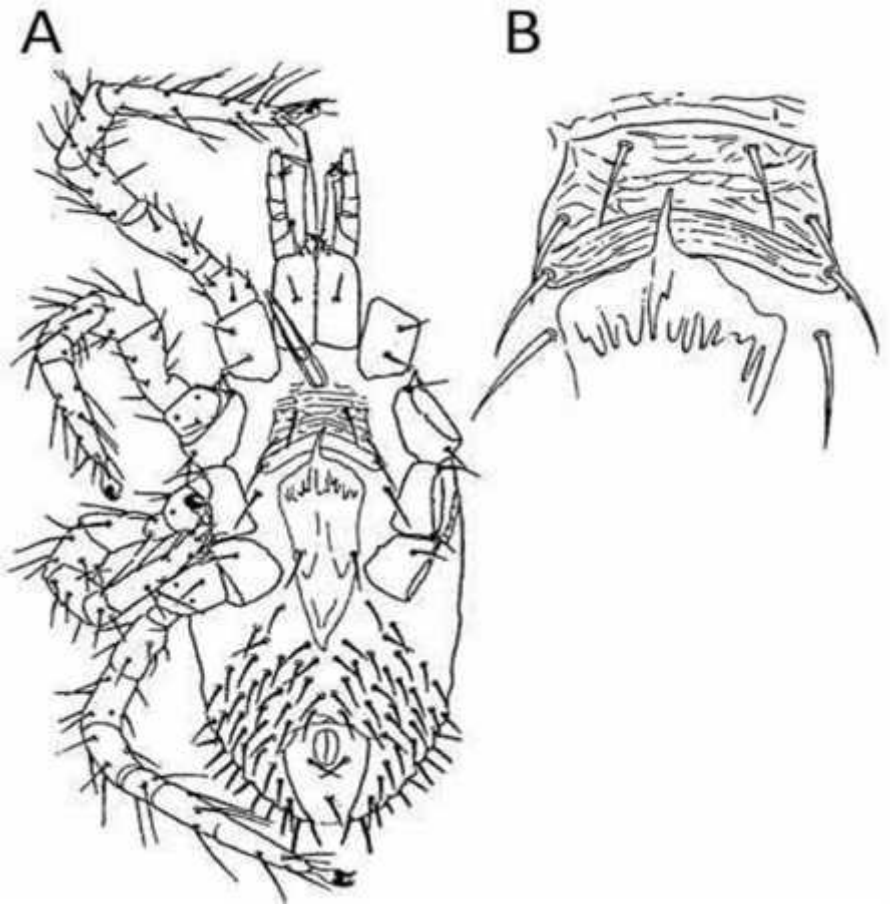

Figure 8: *Steatonyssus longipes* Radovsky and Yunker, 1963. A, female venter, B, sternal shield of female (Radovsky and Yunker, 1963)

Key to mites associated with bats in Egypt

1. Tritosternum absent or present in a shape of tritosternal base remnant…. (Fig.1B); stigma dorsal (Fig. 1A).....Spinturnicidae Oudemans... ..2

- Tritosternum well developed, with laciniae; stigma ventral…….....(Fig. 2) Macronyssidae Oudemans.....6

2. Claws I not enlarged; caruncles I developed.....3

- Claws I greatly enlarged; caruncles I rudimentary/reduced…..……. …….....*Ancystropus* Kolenati.. …..……5

3. Tritosternum represented by tritosternal base remnant..... *Meristaspis* Kolenati.....4

- Tritosternum absent (Fig. 3).....*Paraperiglischrus rhinolophinus* C.L. Koch

4. Female idiosoma with a transverse line, a pair of setae immediately behind dorsal shield (Fig. 4).....*M. lateralis* Kolenati

- Female idiosoma without such transverse line or pair of setae……..……..…. (Fig. 5) ……...*M. kenyaensis* (Radford)

5. Short, stout, pointed, anteroventral seta on tarsus I of female proximal to anteroven tral process; sternal shield of female slightly wider than long, subquadrate…….(Fig. 6); tritosternum of male about four times as wide as long..... *A. aethiopicus* Hirst

- Short, broad, anteroventral, rodlike seta on tarsus I of female proximal to antero ventral process; sternal shield of female almost twice as wide as long, suboval (Fig. 7); tritosternum of male about five times as wide as long..... *A. zeleborii* Kolenati

6. First pair of sternal setae slightly shorter than third pair (st1:st3 = 45-50:56-60) (Fig. 8).....*Steatonyssus longipes* Radovsky and Yunker

- First pair of sternal setae greatly shorter than third pair (st1:st3 = 1:3)..... .....*S. murinus* (Lucas)