



## Fur mites of the family Myobiidae (Acari : Prostigmata) parasitic on bats in Peninsular Malaysia

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### INTRODUCTION

Mites of the family Myobiidae are cosmopolitan ectoparasites of insectivores, bats, rodents and marsupials. They are elongated mites, 0.6 x 0.3 mm or smaller. Morphologically, myobiid mites are perfectly adapted to a parasitic way of life in the fur of their hosts. They attach to their hosts by means of highly modified legs I. Dusbabek (1969) has illustrated a high degree of zoogeographic correlation between myobiid mites and their hosts. He feels that these mites may have evolved originally as parasites of marsupials, later transferring to more advanced forms. Fain (1975) has determined that parallelism exists between the evolution of myobiids and mammalian hosts. He distinguished three major myobiid categories on the basis of leg development: a primitive marsupial group, a rodent group and an insectivore-bat group. Myobiids parasitizing bats are commonly correlated in degree of primitiveness with their bat hosts. In Peninsular Malaysia, myobiid mites were found on 6 of the 7 families of bats examined (Beck 1971).

Lukoschus and his colleagues in the Netherlands have made notable contributions to enhance our knowledge of the life histories of myobiid mites in recent years. There are usually 7 stages, *i.e.* egg, prelarva, larva, protonymph, deutonymph, tritonymph and adult. However, in the genus *Eadiea* and in the subgenus *Doreyana* of *Ewingana* the tritonymphal stage is lacking. Feeding of the active stages is more or less confined to the bases of hair follicle. They feed on tissue juices of the host and female myobiids have been observed to ingest blood during reproductive periods. On laboratory

rodents at least 3 species of myobiids are known to cause dermatitis, alopecia and trauma (Baker *et al.* 1956). The host-parasite relationship with special reference to lesions produced by myobiid mites, *Ewingana inaequalis* and *E. lavoipierrei*, in the skin of their bat hosts is elegantly described by Lavoipierre & Beck (1970).

The first report on mites of the family Myobiidae in Peninsular Malaysia is that by Paran (1966). He described *Neomyobia lavoipierrei* from a bat, *Tadarida johorensis* in South Peninsular Malaysia, based on a single female specimen. This species was subsequently transferred to the genus and subgenus *Ewingana* (Dusbabek 1968). *E. lavoipierrei* (Paran) also parasitizes *Tadarida plicata* (Lavoipierre & Beck 1970). Three other species parasitizing bats were described between 1973 and 1978, *viz.* *Pteracarus macfarlanei* Fain, 1973 ex *Murina huttoni*; *Pteropimyobia pahangensis* Fain, 1973 ex *Macroglossus minimus*; and *Binuncus (Probinuncus) balionycteris* Fain, 1978 ex *Balionycteris maculata*. Fain *et al.* (1980) reported on 9 species of myobiid mites from Malaysian rodents. In this paper 6 species of myobiid mites recovered from bats in Peninsular Malaysia are reported. This brings the number of known species of myobiid mites in Peninsular Malaysia to 19. A new subspecies, *E. bispinosa plicata* is proposed, and the males of *E. cheiromeles*, *E. furcifer* and *Hipposiderobia phyllorhinae* are described in this paper for the first time. *Metabinuncus javanicus* Fain, 1978 described from male specimens is synonymized with *M. birmanicus* Fain, 1976.

The holotype, allotypes and paratypes are deposited in the British Museum (Nat. Hist.), London. Paratypes and additional specimens are deposited, as available, in the Prince Leopold Institute of Medical Research, Antwerp, Belgium; Rijksmuseum van Natuurlijke Historie, Leiden; Institute for Medical Research, Kuala Lumpur; and in the collection of the authors.

All measurements in the descriptions are given in micrometres ( $\mu\text{m}$ ).

## DESCRIPTION OF SPECIES

### *Ewingana (Ewingana) bispinosa plicata* n. subsp.

The new subspecies differs from the typical form found on a Molossid bat in Africa and from the subspecies *longispina* Fain & Lukoschus, 1979 described from a Molossid bat in Australia in several respects as summarized in Table 1.

**FEMALE:** Holotype, 540 long and 190 wide. In 2 paratypes length varies between 480 and 540. General aspect as in typical form, but lengths and widths of most of the setae are smaller. Posterior region of venter with a non-striated area bearing a sclerotized longitudinal tube with posterior opening. This tube presents 2 loops at  $180^\circ$  and is 105 long (including loops). The tube is also present in the two other subspecies but they are shorter and straight. In the drawing of *E. bispinosa longispina* Fain and Lukoschus, 1979 this structure is inadvertently omitted.

Table 1. Measurements (in micrometers) of *E. bispinosa* ssp.

FEMALE	<i>E. bispinosa</i> <i>bispinosa</i> (holotype)	<i>E. bispinosa</i> <i>longispina</i> (paratype)	<i>E. bispinosa</i> <i>plicata</i> (holotype)
<i>Body length x width</i>	660 x 255	561 x 180	540 x 190
<i>Setae</i>			
<i>d 1</i> (length x width)	78 x 15	72 x 10-12	57 x 11
<i>d 2</i> (length x width)	78 x 14	72 x 10	57 x 10
<i>d 3</i> (length x width)	84 x 13	72 x 10	57 x 9
<i>d 4</i> (length)	87	69	55
<i>l 1</i> (length x width)	135 x 15	108 x 12	100 x 12
Dorsal seta of trochanters IV	135	105	90
Posterior seta of femur IV	150	120	90
<i>Copulatory tube</i> (ventral)	straight; 40 µm long	Straight; 39 µm long	forming 2 loops at 180° 105 µm long
<hr/>			
MALE	2 specimens from <i>Tadarida</i> sp. in Rwanda	(holotype)	(allotype)
<i>Body length x width</i>	420-450 x 170-180	480 x 195	425 x 165
<i>Setae</i>			
<i>d 1</i>	29-30	36	30
<i>l 2</i>	72	90-100	65
<i>d 3</i>	80	75	64
<i>d 4</i>	33-39	45	36
Dorsal seta of trochanter IV	75	120	75
Posterior seta of femur IV	90	140	80
Paramedian postgenital setae			
long setae	66-72	100	120
short setae	32-40	80	50

MALE: Allotype 425 long and 165 wide. Most of setae are shorter than in the 2 other subspecies except for the long paramedian seta situated behind the genital orifice, which is longer than in *E. bispinosa longispina*.

REMARKS: In the female, the new subspecies differs from the 2 other sub-

species by the different shape and length of copulatory tube and by shorter length of most idiosomal setae. The male is distinguished by the shorter length of most setae and by the greater length of the long paramedian post-genital seta. The usually short paramedian postgenital seta is much reduced.

*Type material:* Holotype female, allotype male and 41 paratypes (11 females, 5 males, 15 tritonymphs, 7 deutonymphs, 1 protonymph, 2 larvae) ex Wrinkled-lipped Bat, *Tadarida plicata* collected from ceiling space of hospital quarters, Kuala Pilah, Negri Sembilan, Malaysia, 9.V.1979.

#### *Ewingana (Doreyana) furcifer* Fain

*Ewingana (Doreyana) furcifer* Fain, 1972: 151, Fain, 1978: 124. Figs. 150–151.

This species was originally described from a single female found on *Nycteris gambiensis* from Guinee-Bissau. This is probably an accidental host; the true host is most probably a molossid bat as is the case for all other species in the genus (see Fain, 1978c).

In Malaysia, 1 female, 1 male, 9 nymphs and 5 larvae were collected from *Tadarida plicata*, roosting in ceiling space of house, Kuala Pilah, Negri Sembilan, 9.V.1979. The male is described here.

MALE: Length (including gnathosoma) 342, width 148. Genital orifice situated at 36 behind the setae *sc i*. Penis 96 long, relatively strong with the apex slightly curved. The genital plate bears a pair of small, short setae. Coxae I with posterior half not striated, but punctate. Another punctate but non-striated median area is present anterior to *ic 4* setae. Legs III–IV as long as width of idiosome. Tarsi II with 2 unequal claws, one 27–30 long, the other very short (4–5 long). *Chaetotaxy:* Setae *v e*, *sc e* and *l 1* are toothed and 80, 88 and 78 long, respectively. The *v i* and *sc i* are microsetae. Setae *ic 1* 65; *ic 2* 90; *ic 3* 105; *ic 4* 120. Setae of coxae I–IV 2-2-0-1; of trochanters II–IV 3-3-3; of femora II–IV 5-3-3; of genua II–IV 7-6-6, of tibiae II–IV 6-6-6; of tarsi II–IV 7-6-6. Trochanter I with a strong furcate lateral seta, as in the female.

#### *Ewingana (Doreyana) cheiromeles* Fain

*Ewingana (Doreyana) cheiromeles* Fain, 1972: 151; 1978: 21; Figs. 54–55.

This species was originally described from a single female recovered from *Cheiromeles jacobsoni* in Northwest Sumatra. The male is described here.

The Malaysian specimens (4 males, 3 females, 16 nymphs, 2 larvae) were found on *Cheiromeles torquatus*, 22 km, Gombak Forest Reserve, Selangor, 4.V.1979. 11 females, 1 male and several immatures were also obtained from *C. jacobsoni* (specimen in collection of Museum of Leiden, No. 28053).

MALE: Length 422, width 215. Genital orifice far in front and situated at 16 behind line joining the *sc i* and *sc e* setae. Penis very thin, flagelliform, about 150–200 long. Genital plate wider (60) than long (40) bearing 3 pairs of small paramedian spines. Ventral surface with 2 non-punctate median areas, one in front of *ic 4* setae, the other smaller inserted between the *ic 3* setae. Posterior half of coxae I with a large non-striate area. Tarsi II–IV with 2 very unequal claws. Legs I very thick. *Chaetotaxy*: Setae *v e*, *sc e*, and *l 1* toothed, 85, 104 and 105 long respectively. Setae *v i* and *sc i* are microsetae. Setae *d 1*, *d 2*, *d 3* thick, toothed and 30, 105 and 75 long respectively. The *ic 1* to *ic 4* very long. Coxal setae (I–IV) 2-2-0-1 much shorter than the *ic* setae. Number of setae on legs as in *E. furcifer*.

REMARK: Several adults (male and female) still enclosed in their nymphal skins were found. These nymphs in which they developed were not tritonymphs but deutonymphs, easily recognizable by the absence of setae on trochanters IV and the second pair of setae on Coxae I.

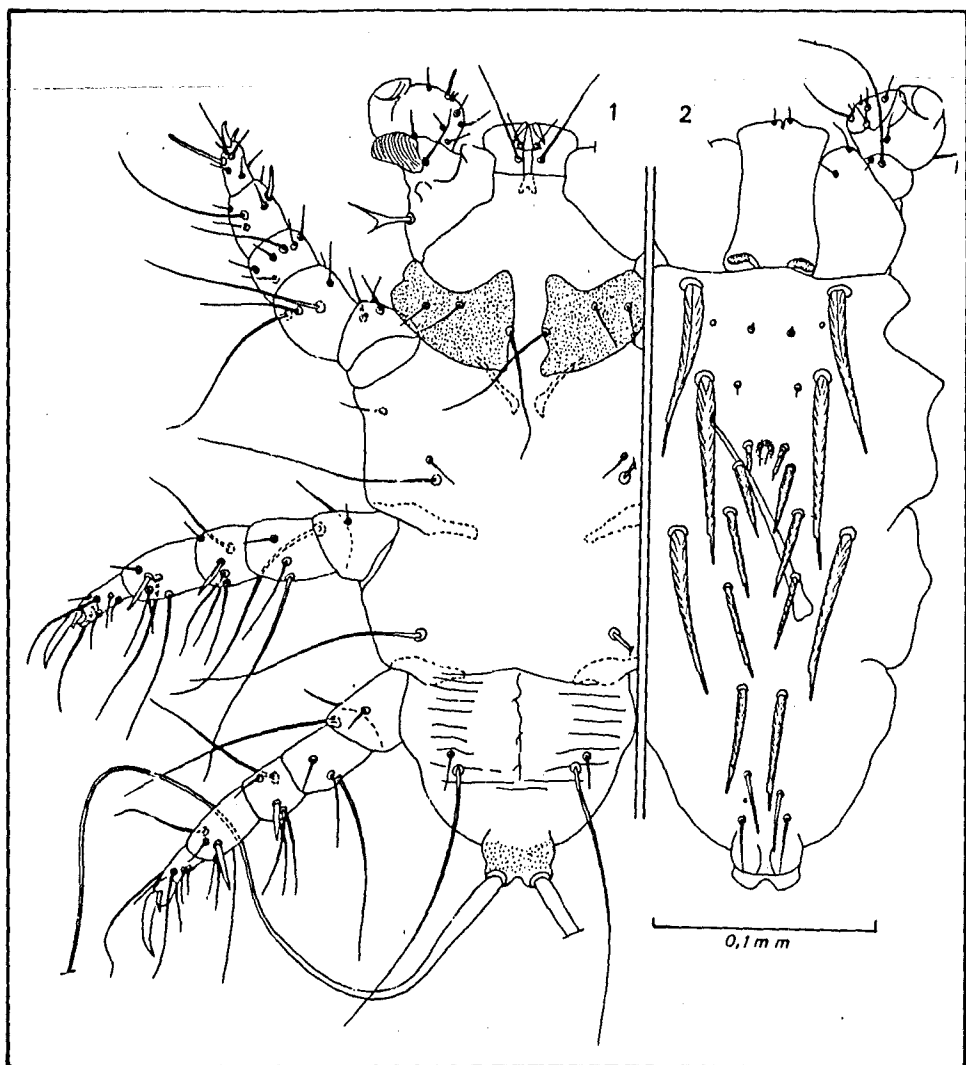
### *Hipposiderobia phyllorhinae* Fain

*Hipposiderobia phyllorhinae* Fain, 1972: 249; Fain, 1978: 211, Figs. 48–49. (male figs. 5–6)

This species was originally described from female specimens found on *Hipposideros diadema* collected in New Guinea. In Malaysia, 3 females, 4 males and 1 nymph were collected from the same species of host in Templer Park Nature Reserve, Selangor, 23.V.1979. The male is described here.

MALE: Length 288, width 180. Genital orifice slightly behind the line joining the *sc e* setae: the genital plate is small and bears 7 pairs of microsetae and one pair of postero-external rodlike setae 33 long. Penis thick, sinuous in its basal third, and 110 long. Setae *v e*, *sc e* and *l 1* toothed, 57, 80 and 63 long respectively. Setae *v i* are microsetae. Setae *sc i* are absent as in the female. There are no paramedian setae behind the genital orifice. All ventral setae, except *l 5*, very short (maximum 6) and thin. Coxae I–IV with 2-1-0-0 setae. Other segments of legs as in the female. Gnathosoma with anterior extremity slightly bilobed as in female. Claws as in female.

REMARK: The claws on leg I in the genus *Hipposiderobia* are either present or absent. They have been observed in *H. ceylanica* (Radford 1951) (see Fain, 1978a), in *H. belli* Fain & Lukoschus, 1979, in *H. okinawaensis* Uchikawa, 1976 and in *H. phyllorhinae* Fain, 1972. They are absent in other species including the type species *H. heteronycha* (Berlese & Trouessart 1889). These claws, when they are present are always very small and in a state of regression. Their complete absence in some species is to be regarded as of specific, and not generic, importance. A similar situation exists in the



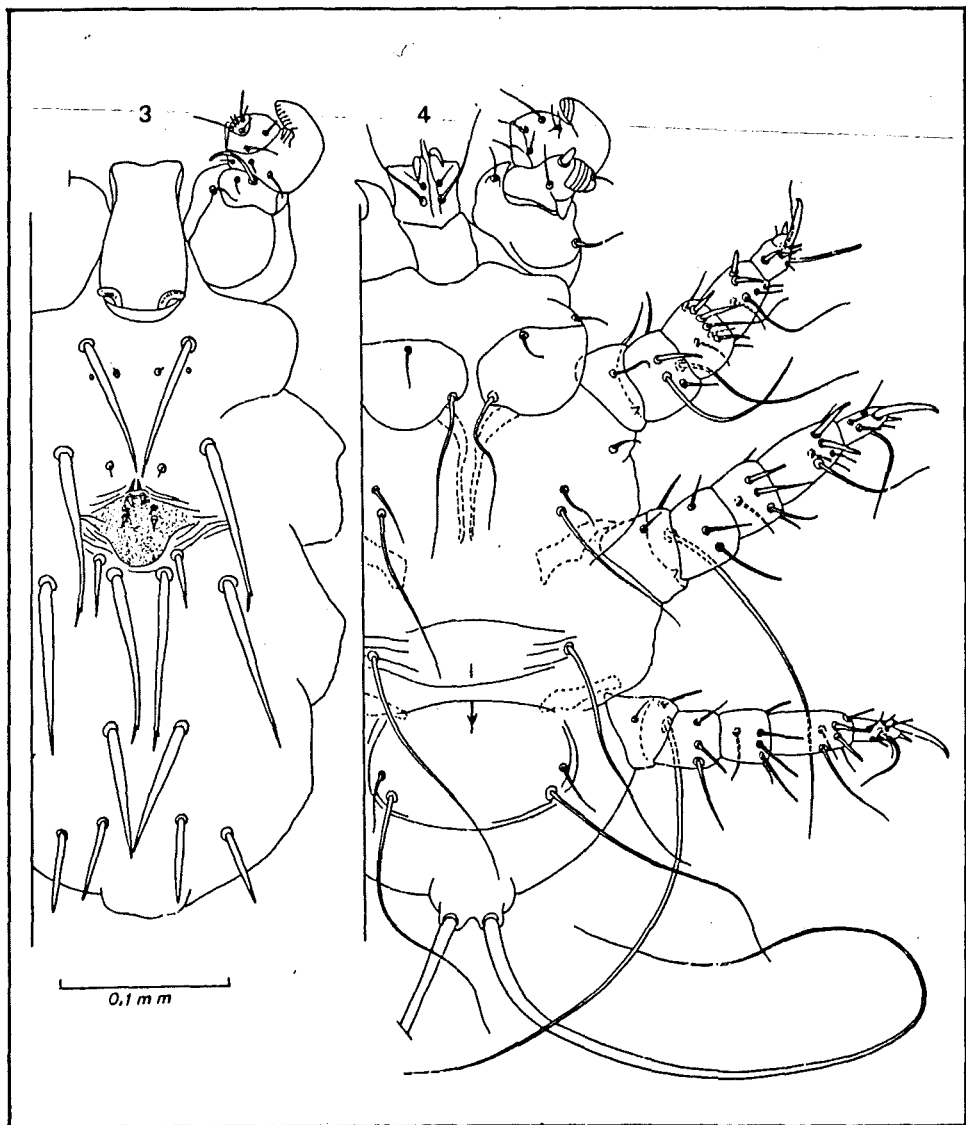
Figures 1 – 2. *Ewingana (Doreyana) furcifer* Fain, 1972 – Male. 1, Ventral view; 2, Dorsal view.

genus *Neomyobia* Radford where all the species bear a pair of small claws on tarsi I excepting *N. chiropteralis* (Michael 1884) which lacks these claws (see Fain 1978c, p. 60).

*Metabinuncus birmanicus* Fain

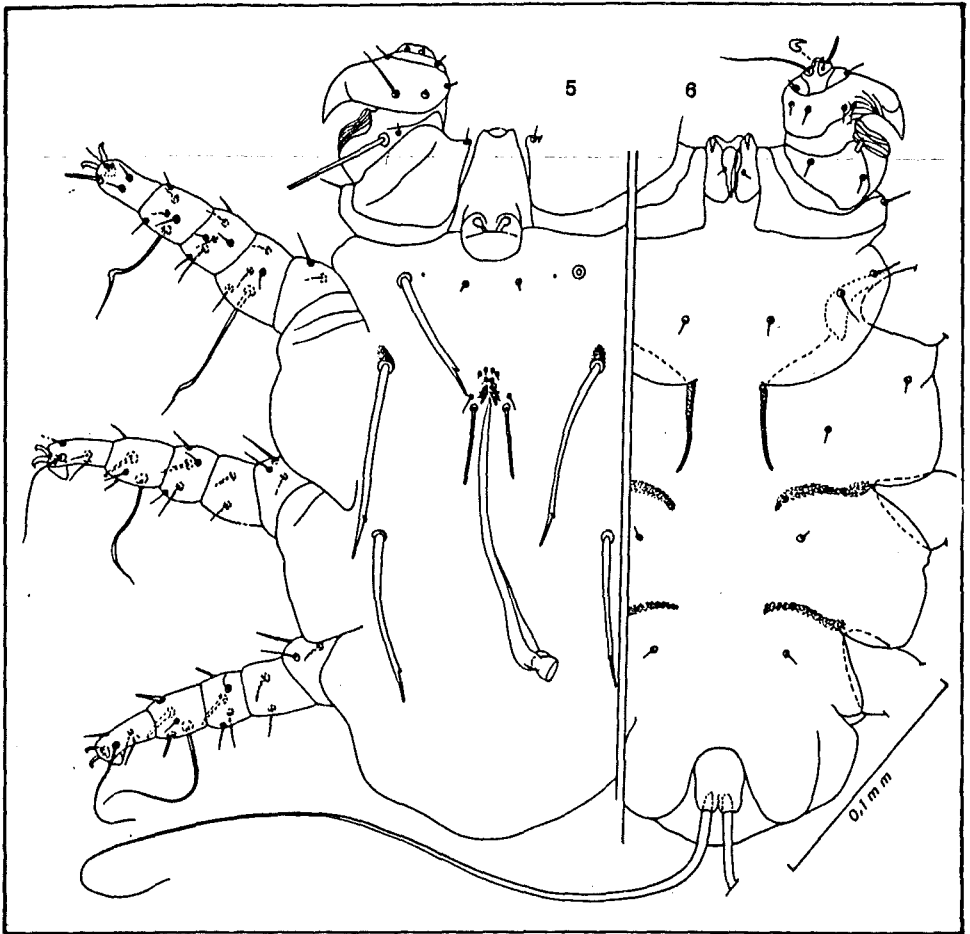
*Metabinuncus birmanicus* Fain, 1976: 24, fig. 32; Uchikawa *et al.*, 1978; 371, figs. 4–5, Uchikawa *et al.*, 1980: 102.

*Metabinuncus javanicus* Fain, 1978: 71, figs. 9–10, NEW SYNONYM



Figures 3 – 4. *Evingana* (*Doreyana*) *cheiromeles* Fain, 1972. – Male. 3, Dorsal view; 4, Ventral view.

The original description of *M. birmanicus* was based on female specimens recovered from *Hipposideros armiger* in Burma. Subsequently, Uchikawa *et al.* (1978) found additional specimens of both sexes on *H. armiger*, *H. larvatus* and *H. lylei* in Thailand. These authors observed that the male of *M. birmanicus* was not separable from *M. javanicus* Fain, 1978 and doubted the validity of the latter species. The description of *M. javanicus* ex *H. larvatus* from Indonesia was based on male specimens. In Peninsular Malaysia



Figures 5 – 6. *Hipposiderobia phyllorhinae* Fain, 1972 – Male. 5, Dorsal view; 6, Ventral view.

several specimens representing males and females of *M. birmanicus* were collected on *H. diadema*. From our own study based on this collection we conclude that the males of *H. birmanicus* and *H. javanicus* are, indeed, identical and we, therefore, propose the synonymy of *H. javanicus* with *H. birmanicus*.

***Binuncus (Binuncus) jamesoni* (Hiregaudar & Bal, 1956)**

The type host of this species is *Rousettus leschenaulti* from India. A male specimen was also found on the same host in Burma by A.F. (not published). In Sabah, East Malaysia, it was found on *Eonycteris spelaea* by Uchikawa (1980) and by F.S.L. Our specimens (17 females, 13 males, 17 nymphs and 7 larvae) were found on bats collected in limestone cave in Raub, Pahang, 13.V.1979.



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