

The Labidocarpine mites (Acari: Chirodiscidae) from oriental bats.**IV. Genera *Olabidocarpus* Lawrence, 1948, *Dentocarpus*****Dusbabek & Cruz, 1966, *Labidocarpellus* Fain, 1976 and *Pteropiella* Fain, 1970, with a key to the genera of Chirodiscidae**

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Summary

The oriental species of the genera *Olabidocarpus* Lawrence, 1948, *Dentocarpus* Dusbabek & Cruz, 1966, *Labidocarpellus* Fain, 1976 and *Pteropiella* Fain, 1970 are revised. The species are redescribed and depicted except for a few which have been fully described recently. The total number of species known from these genera in this region is now 17. *Labidocarpellus papuanus* Fain, 1975 is replaced in the genus *Pteropiella*. The subgenus *Dentocarpus* (*Paradentocarpus*) Fain, 1976 is placed in synonymy with *Labidocarpellus* and the three species described in this subgenus (*D. (P.) abyssinicus* Fain, 1976, *D. (P.) phyllodermae* Fain, 1976, and *D. (P.) kimberleyensis* Fain & Lukoschus, 1981) are transferred to *Labidocarpellus*. *Labidocarpellus notopteris* Fain, 1976 and *L. novaeguineae* Fain, 1976 are now transferred to *Dentocarpus*. *Olabidocarpus peropteryx* Fain, 1972 and *O. guyanensis* Fain, 1972 are transferred to *Labidocarpellus*. A key is given to all the genera of Chirodiscidae parasitic on bats.

Introduction

In three previous papers (Fain, 1980, 1981, 1982) a series of genera of the Chirodiscidae represented in oriental bats have been revised: *Afrolabidocarpus* Fain, 1970, *Asiolabidocarpus* Fain, 1972, *Parakosa* McDaniel & Lawrence, 1962, *Paralabidocarpus* Pinichpongse, 1963, *Labidocarpoides* Fain, 1970, *Labidocarpus* Trouessart, 1895 and *Alabidocarpus* Ewing, 1929.

The remaining genera of this family are revised in this paper: *Olabidocarpus* Lawrence, 1948, *Dentocarpus* Dusbabek & Cruz, 1966, *Labidocarpellus* Fain, 1976 and *Pteropiella* Fain, 1970. These genera are represented in oriental bats by 17 species, of which 14 are endemic in the oriental Region. All the species are redescribed and depicted for the first time except four which have already been fully

described recently.

The following synonymies or new combinations are proposed herein:

1. Subgenus *Dentocarpus* (*Paradentocarpus*) Fain, 1976 is placed in synonymy with *Labidocarpellus*.
2. The three species described in the subgenus *Paradentocarpus* (e.g., *D. (P.) abyssinicus* Fain, 1976, *D. (P.) phyllodermae* Fain, 1976 and *D. (P.) kimberleyensis* Fain & Lukoschus, 1981) are transferred to *Labidocarpellus*.
3. *Labidocarpellus notopteris* Fain, 1976 and *L. novaeguineae* Fain, 1976 are transferred to *Dentocarpus*.
4. *Olabidocarpellus peropteryx* Fain, 1972 and *O. guyanensis* Fain, 1972 are transferred to *Labidocarpellus*.

In Tables I and II we give a list of the genera of Chirodiscidae represented in bats.

Table I.
Number of species in the genera of Chirodiscidae parasitic on oriental bats

Genera	No. of oriental species	Endemic species in oriental region	No. of known species including oriental species	Genus endemic in oriental region
<i>Paralabidocarpus</i>	6	6	18	—
<i>Labidocarpoides</i>	3	2	5	—
<i>Labidocarpus</i>	8	7	11	—
<i>Olabidocarpus</i>	6	4	21	—
<i>Dentocarpus</i>	6	5	16	—
<i>Asiolabidocarpus</i>	3	3	3	+
<i>Afrolabidocarpus</i>	4	3	5	—
<i>Parakosa</i>	4	4	7	—
<i>Labidocarpellus</i>	5	5	11	—
<i>Pteropiella</i>	2	1	2	—
<i>Alabidocarpus</i>	11	8	39	—
Total	58	48	138	

Generic characters in the Chirodiscidae

The generic classification in the family Chirodiscidae is particularly difficult because of the lack of good morphological characters. The discovery of a series of new species during last few years has clarified the situation somewhat and a more natural classification of this group is now possible.

The most important characters in the separation of genera are the following:

1. Presence or absence of a pedunculate sucker on leg III and IV. In some genera only the peduncle of the sucker is present, the sucker itself being lacking; in other genera this peduncle is also lacking.
2. Degree of development and shape of the pre-scapular plate, either median and single or paired

and represented by two paramedian plates. The presence or absence of paramedian lobes on the posterior border of the plate is also an important character.

3. Presence or absence of a very distinctly raised cuticular crest behind the prescapular plate. On this crest the cuticular striations are very close to each other and more numerous than on the cuticle of the body.
4. Presence or absence of postscapular plate(s).
5. Structure of the tarsi III or IV. The tarsus IV is strongly elongate in *Afrolabidocarpus*. In *Lawrenceocarpus* the tarsi III bear only one ventral striated spine, instead of two striated spines as in all the other genera. In *Trilabidocarpus* the tarsus IV ends in a spine bearing a large membrane.

Table II.
Genera of Chirodiscidae parasitic on bats not represented in oriental region

Genera	No. of species	Region
<i>Lawrenceocarpus</i>	9	Neotropical
<i>Megadermicolus</i>	1	Afrotropical
<i>Trilabidocarpus</i>	1	Afrotropical
<i>Adentocarpus</i>	1	Afrotropical

Key to the Labidocarpinae

1. Tarsi III-IV with a pedunculate sucker in both sexes *Paralabidocarpus* Pinichpongse, 1963
Tarsi III either with or without pedunculate suckers. Tarsi IV always without suckers in both sexes, but sucker-peduncle may be present . 2
2. Tarsi III with pedunculate suckers in both sexes.
Tarsi IV in female with a peduncle without

- sucker. Tarsi IV in male, modified, flattened, triangular and without sucker or sucker peduncle *Labidocarpoides* Fain, 1970
Tarsi III-IV without suckers; a sucker peduncles is either present or absent on these legs 3
3. Sucker peduncles present on tarsi III-IV in both sexes 4
Sucker peduncles either present on tarsi III-IV of females and on tarsi III of males or vestigial or absent on tarsi III-IV in both sexes 10
4. In both sexes: peduncle of tarsi III-IV inflated and as long as the apical spine of tarsi. Posterior extremity of female with 6 pairs of setae *Megadermicolus* Fain, 1971
In both sexes: peduncle of tarsi III-IV cylindrical and much shorter than apical spine of tarsi. 5
5. Cuticle behind prescapular plate surelevated with numerous striations close together, forming a median crest. Presence of two narrow paramedian longitudinal sclerotized plates *Olabidocarpus* Lawrence, 1948
Cuticular crest absent behind the prescapular plate 6
6. Posterior margin of prescapular plate with four lobes: two paramedian triangular and two lateral more rounded. (In *D. notopteris* the lateral lobes are lacking.) Postscapular plate(s) either present or absent. *Dentocarpus* Dusbabek & Cruz, 1966
Prescapular plate without posterior paramedian lobes 7
7. Prescapular plate poorly developed, wider than long. 8
Prescapular plate well developed, longer than wide 9
8. Tarsus IV in male ending in a normal apical spine, without membrane *Parakosa* McDaniel & Lawrence, 1962
(= *Afrokosa* Fain, 1970)
Tarsus IV in male ending in a spine bearing a large membrane *Trilabidocarpus* Fain, 1970
9. Very large median postscapular plate present, wider and longer than the prescapular plate, the latter with a straight posterior margin
. *Adentocarpus* Fain, 1972
Two narrow paramedian postscapular plates present, either straight or L-shaped. Posterior margin of prescapular plate either straight or concave. Coxae II variably developed.
. *Labidocarpellus* Fain, 1976
(= *Dentocarpus (Paradentocarpus)* Fain, 1976)
10. Sucker-peduncle present on tarsi III-IV of female and on tarsi III of male. Tarsi IV of male flattened and triangular. 11
Sucker-peduncles on tarsi III-IV in both sexes vestigial or completely absent 12
11. Medio-dorsal cuticular crest absent behind prescapular plate; large postscapular plates absent *Labidocarpus* Trouessart, 1895
(= *Schizolabidocarpus* Fain, 1976)
Medio-dorsal cuticular crest present behind prescapular plate; two large postscapular plates present.
. *Asiolabidocarpus* Fain, 1972
12. Two paramedian prescapular plates present. Sucker-peduncles vestigial or absent.
. *Pteropiella* Fain, 1970
One median prescapular plate present. Sucker-peduncles absent. 13
13. In both sexes: legs IV abnormally long and with tarsi elongate, and much longer than wide. Prescapular plate with posterior border strongly incised forming 4 long lobes. Setae *d* 5 and *l* 5 short or very short
. *Afrolabidocarpus* Fain, 1970
In both sexes: legs III-IV equal or subequal with tarsus IV very short; prescapular plate normal. Female with *l* 5 well developed (except in *Alabidocarpus rousetti* Fain). 14
14. Tarsi III in both sexes with one ventral striated spine
. *Lawrenceocarpus* Dusbabek & Cruz, 1966
Tarsi III in both sexes with two ventral striated spines
. *Alabidocarpus* Ewing, 1929

Genus *Olabidocarpus* Lawrence, 1948

This genus is characterized by the following characters, in both sexes: presence on tarsi III and IV of

peduncle of suckers but no suckers, presence of a pair of paramedian longitudinal sclerites (= post-scapular plates). The gnathosoma is not lobed. The prescapular plate bears two well developed lateral lobes. There is a cuticular crest in the midline, behind the prescapular plate. This crest is formed of numerous very thin striations close to each other and surelevated.

This genus at present contains 21 species of which five occur in the oriental region. They are difficult to separate from each other. The most reliable characters for separating these species in the females are the following: size of body, length of plates (prescapular and postscapular) and of the cuticular crest, number of cuticular striations of the body (laterally, between setae *sc e* and *l 5*) and on the crest, the degree of development and the shape of coxa II, the presence or absence of setae *sh*, the length of *h*, *d 5* and *l 5*, and the presence of punctate transverse bands on the cuticle or of small punctate scales along the cuticular striations.

Type species: Labidocarpus belsorum van Eyndhoven, 1940.

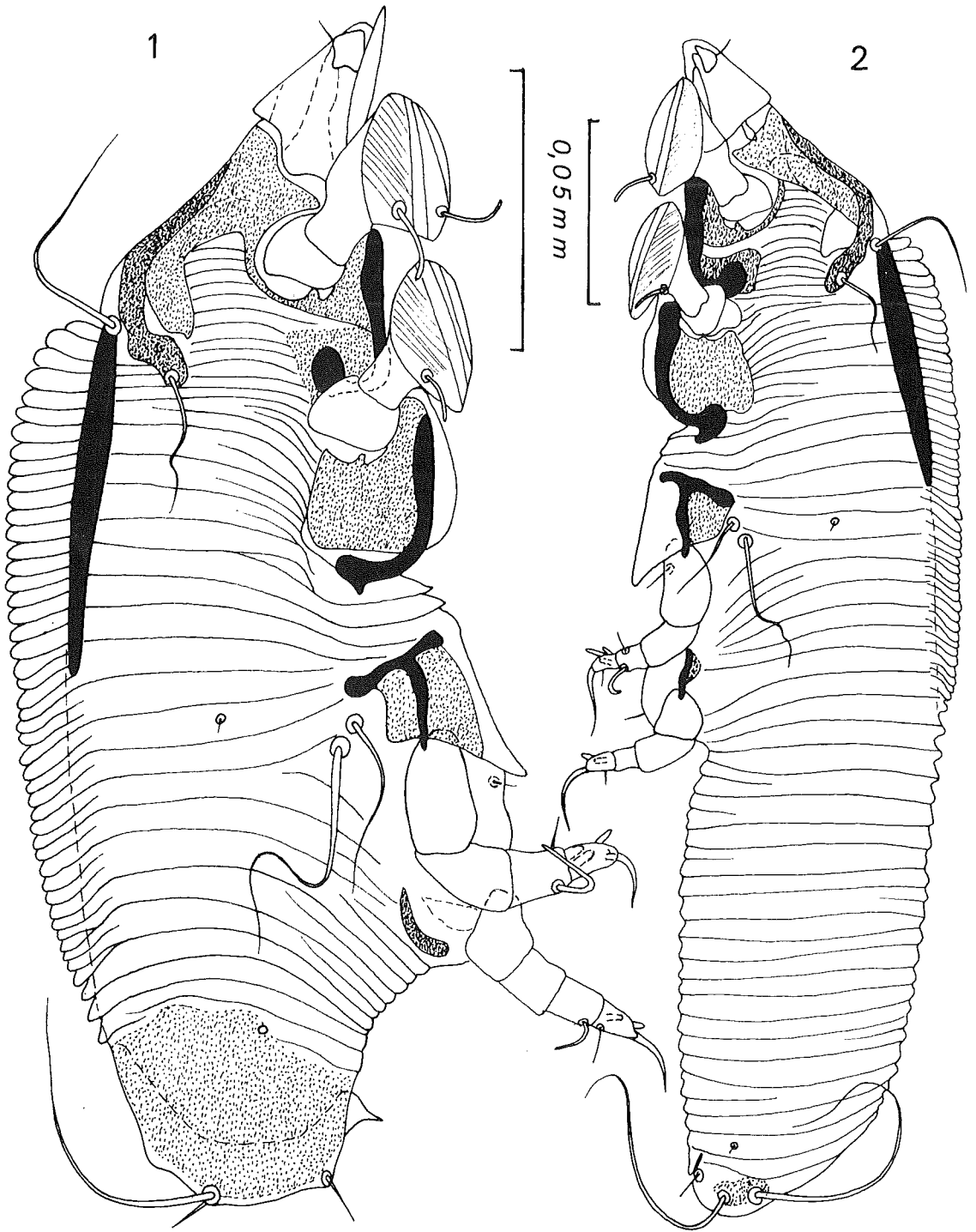
Key to the known species of the genus *Olabidocarpus* (females)

(N.B. *O. nyctinomis* Fain, is known only from the male)

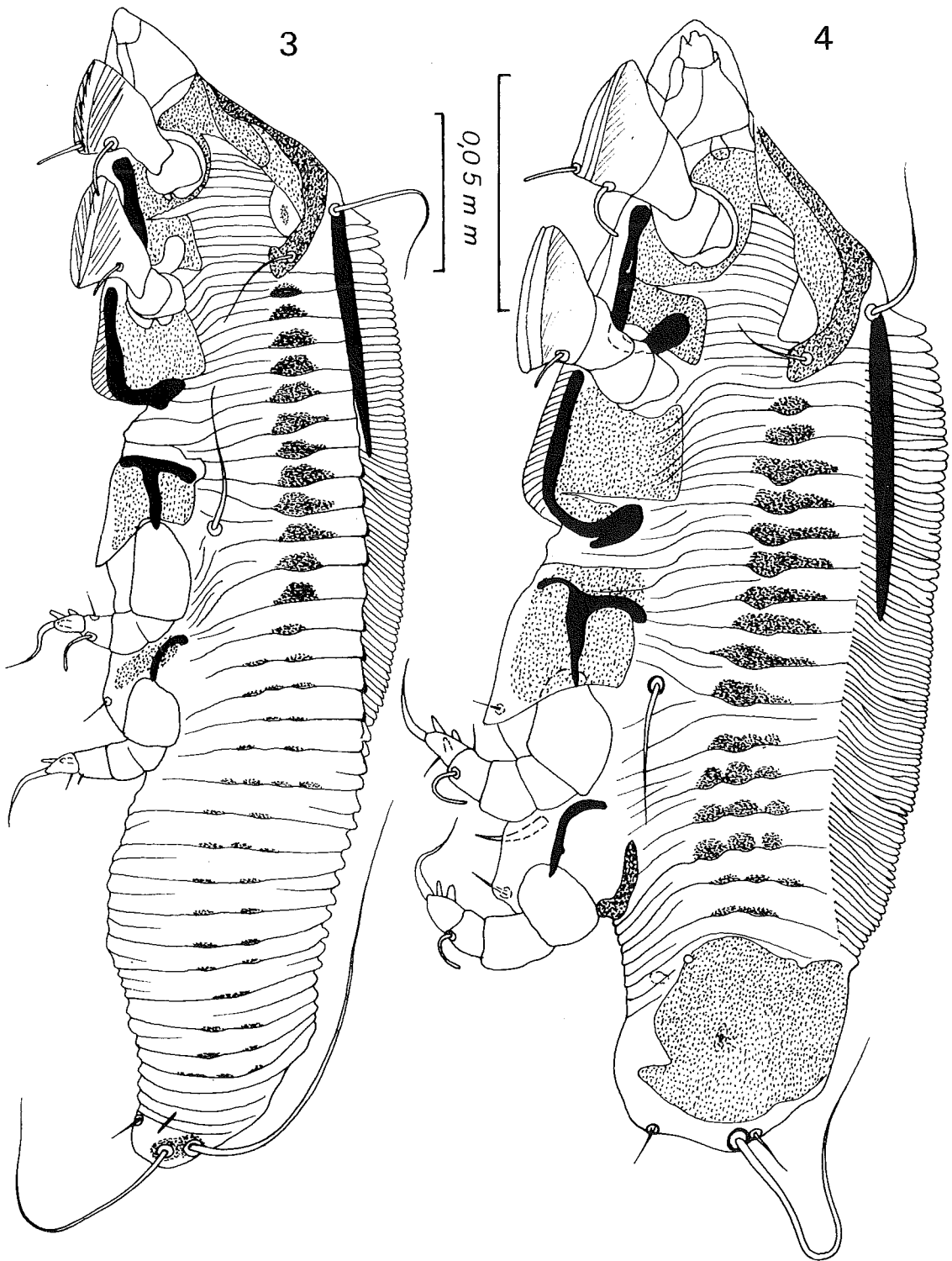
1. Coxae II poorly or very poorly developed, more or less triangular. Setae *sh* 45 to 60 μ long. Cuticle without scales or punctate bands. Five species from Molossidae and one from Emballonuridae (*O. taphozous*) group *otomops* (2)
- Coxae II well developed, quadrangular, except in *O. nycteris* and *O. tanganyicensis* where these coxae are relatively small. Setae *sh* variable 5
2. Cuticular crest 115 μ long with 85 striations *O. kelantanensis* Fain, 1976
- Cuticular crest 60 to 82 μ long with 30 to 43 striations 3
3. Larger species (375 μ long) *O. otomops* Fain, 1970
- Smaller species (280 to 312 μ) 4
4. Length 280 μ . With 35 body striations (between

- sc e* and *l 5*). Crest 60 μ long, with 30 striations *O. cynomops* Fain, 1972
- Length 312 μ . With 28 to 29 body striations (between *sc e* and *l 5*). Crest 82 μ long with 43 striations *O. taphozous* Fain, 1976
5. Setae *sh* completely absent 6
- Setae *sh* present 11
6. Lateral surface of body with punctate bands or punctate scales 7
- Lateral surface of body bare, without these structures group *belsorum* (10)
7. Punctate bands narrow (6 to 14 μ wide) and 3 to 6 μ long. group *eptesticus* (8)
- Either with wide and relatively long punctate bands or with numerous small punctate scales along striations. group *myoticola* (9)
8. Body longer (351 μ long) with a punctate band (5 to 6 μ long and 8 to 14 μ wide) on the 7 or 8 first striations behind setae *sc e*. Coxa II 27 μ maximum width and 27 μ long along its dorso-lateral margin. *O. eptesticus* Fain, 1970
- Body shorter (294 μ) long with a punctate band (3 to 4 μ long and 6 to 10 μ wide) on the 12 first striations behind setae *sc e*. Coxa II 27 μ maximum width and 18 μ long along its dorso-lateral margin. *O. orientalis* Fain, 1976
9. All the striations with 2 to 6 small punctate marginal scales. Body 291 μ long. Setae *d 5* and *l 5* 72 μ 120 μ long respectively. Body length 291 μ . Crest 110 μ long, with 52 striations. There are 44 striations between setae *sc e* and *l 5* *O. myoticola* Fain, 1970
- First 12 to 14 striations (behind *sc e*) with wide punctate and scaly bands (4 to 5 μ long and 15 to 25 μ wide). The 12 to 14 more posterior striations only with marginal scales. Setae *d 5* 36 μ , *l 5* 90 to 100 μ . Body length 330 μ . Crest 141 μ , with 75 striations. There are 34 striations between *sc e* and *l 5*. *O. squamosus* Fain, 1971 n.stat.
10. Body 330 μ long. Crest 120 to 130 μ with 45 to

- 55 striations. On *Myotis* spp
 *O. belsorum* (Van Eyndhoven, 1940)
 (? = *O. whitakeri* McDaniel & Coffman, 1970)
 Body 276 μ long. Crest 105 μ with 60 striations
 *O. triaenops* Fain, 1976
11. Cuticular crest not longer than postscapular
 plates. Coxa II relatively small.
 group *nycteris* (12)
 Cuticular crest from 1.5 to 2.1 times as long as
 postscapular plates. Coxae IV large 13
12. Crest with 9 striations and 54 μ long. Post-
 scapular plates 57 μ long. Lateral surfaces of
 body with 24 striations (between *sc e* and *l 5*).
 Setae *sh* 50 μ
 *O. tanganyicensis* (Pinichpongse, 1963)
 Crest with 13 striations and 34 μ long. Post-
 scapular plates 30 to 35 μ long. Lateral surfaces
 of body with 42 striations. Setae *sh* 9 μ long
 *O. nycteris* Fain, 1976
13. Striations with numerous very small punctate
 marginal scales
 group *plecoti* (14)
 Lateral surfaces of body with punctate bands
 very poorly developed or absent 15
14. Cuticular striations each with 10 to 15 very
 small punctate scales at their margins. Post-
 scapular plates longer (84 μ). Cuticular crest
 shorter (108 μ) with 40 striations. Body 360 μ
 long.
 *O. chalinolobi* Fain, 1979
 Cuticular striations each with 5 to 10 small
 punctate scales at their margins. Postscapular
 plates shorter (78 μ). Cuticular crest longer (140
 to 150 μ) with 60 to 70 striations. Body 402 μ
 long. *O. plecoti* Fain, 1971
15. Lateral surfaces of body without punctate
 bands or scales. Body larger (420 μ to 530 μ
 long). Crest with 30 to 46 striations.
 group *africanus* (16)
 Lateral surfaces of body with poorly developed
 punctate bands. Body smaller (305 to 337 μ
 long). Crest 120 to 125 μ long with 43 to 60
 striations
 group *malayi* (17)
16. Body length 420 μ . Crests 150 μ long, with 46
 striations. Opisthosoma distinctly shorter than
 half of body length. Seta *sh* half the length of *h*
 *O. africanus* Fain, 1970
 Body length 530 μ . Crest with 25 to 30 stri-
 ations. Opisthosoma distinctly longer than half
 of body length. Seta *sh* as long as *h*.
 *O. lawrencei* McDaniel & Coffman, 1970
17. Body 305 μ long. Crest with 43 to 45 striations.
 Setae *d 5* and *l 5* subequal (60 and 80 μ)
 *O. malayi* Fain, 1970
 Body 337 μ long. Crest with 60 striations. Setae
d 5 and *l 5* very unequal (75 and 135 μ).
 *O. americanus* McDaniel & Lawrence, 1964
1. *Olabidocarpus malayi* Fain, 1970
- Female* (Fig. 2): Holotype 305 μ long and 90 μ wide.
 There are 40 to 42 striations between setae *sc e* and
l 5. Most of the striations bear very poorly distinct
 punctate bands. Prescapular plate 42 μ long in
 midline. Postscapular plates and crest 65 μ and
 120 μ long respectively, the latter with 43 to 45
 striations. Setae *sh* 25 μ , *h* 30 μ , *d 5* 60 μ , *l 5* 80 μ .
 Coxa II well developed, rectangular.
- Male* (Fig. 1): Allotype 210 μ long, 80 μ wide. There
 are 20 to 21 striations between *sc e* and pygidial
 plate. These striations bear darker narrow bands.
 Postscapular plate 63 μ long. Crest extending from
 setae *sc i* to near opisthosomal plate. Opisthosomal
 plate 36 μ long. Setae *sh* 25 μ , *h* 42 μ , *d 5* 8 μ , *l 5*
 50–60 μ (?).
- Host and locality*: (1) On *Pipistrellus stenopterus*
 (= *Pterygistes stenopterus*), Kuala Lumpur. Bat in
 BM No. 1637–38. Holotype and two paratypes
 female, two paratypes male. Holotype in BM; (2)
Pipistrellus sp. (probably *P. angulatus*), New
 Guinea (1890). Bat in IRSNB. Two females and
 one male. *O. malayi* has also been recorded
 from Australia, on *Eptesicus douglasi* (Fain &
 Lukoschus, 1981).
2. *Olabidocarpus orientalis* Fain, 1976
- Female* (Fig. 3): Holotype 294 μ long, 79 μ wide. In
 a paratype (larvigerous) 310 \times 82 μ . There are 33
 striations laterally, between setae *sc e* and *l 5*. The
 12 anterior striae bear laterally a narrow, punctate,
 very distinct band wider (6 to 10 μ) than long (3 to
 4 μ); the more posterior striations are very slightly



Figs. 1-2. *Olabidocarpus malayi* Fain. Fig. 1. Male. Fig. 2. Female, holotype.



Figs. 3-4. *Olabidocarpus orientalis* Fain. Fig. 3. Female, holotype. Fig. 4. Male.

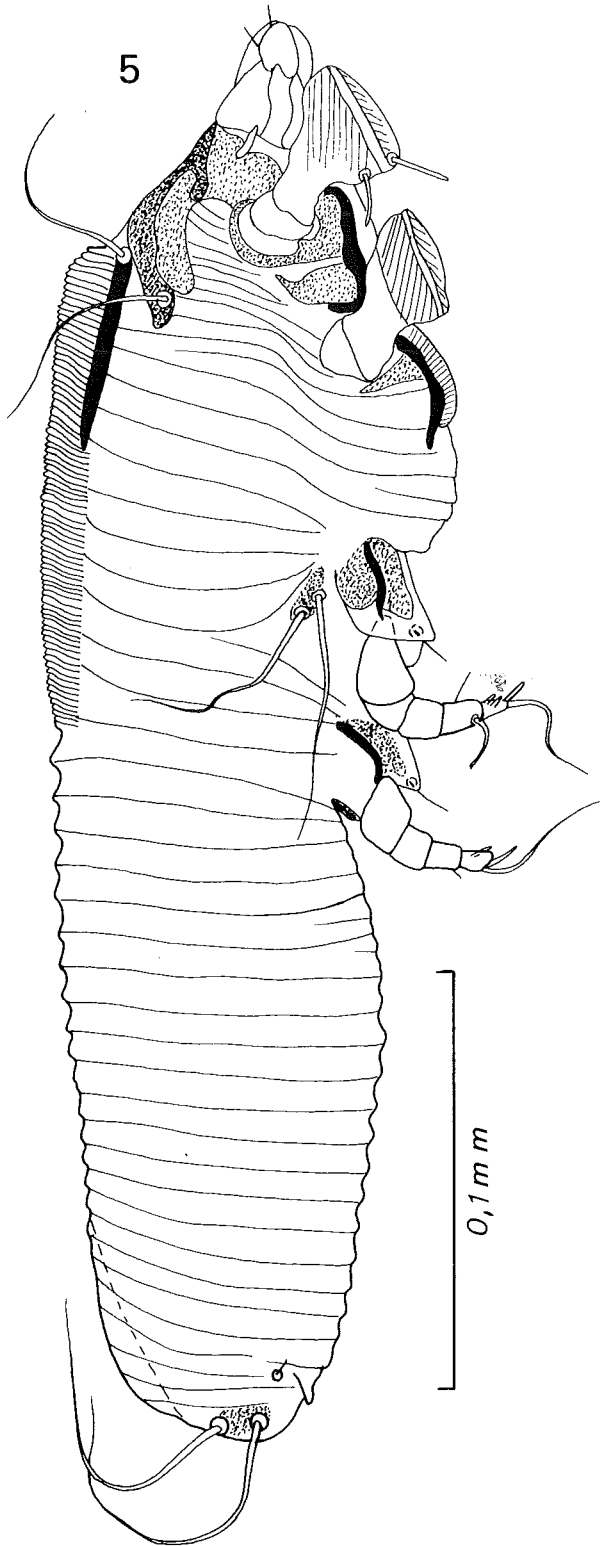


Fig. 5. *Olabidocarpus kelantanensis* Fain. Female, holotype.

sinuous and bear indistinct punctated areas. Prescapular plate $42\ \mu$ long in midline. Postscapular plates $63\ \mu$ long. Cuticular crest $132\ \mu$ long formed of 70 striations. Setae *sh* absent, *h* $33\ \mu$, *d* $5\ 70\ \mu$, *l* 5 broken in the holotype, $110\ \mu$ in a paratype. Coxa II well developed, quadrangular, $27\ \mu$ maximum width and $18\ \mu$ long along lateral margin. Tarsi III-IV ending in a thick spine very finely attenuated at apex. Solenidion of tibia IV vestigial. **Male** (Fig. 4): Allotype $225\ \mu$ long, $78\ \mu$ wide. There are 18 cuticular sinuous striations counted between *sc e* and opisthosomal plate. The 16 anterior striations bear one or two punctate bands. Prescapular and postscapular plates $42\ \mu$ and $60\ \mu$ long; crest as long ($135\ \mu$) as the dorsum (between prescapular and opisthosomal plates). Opisthosomal plate $43\ \mu$ long. Setae *d* 4 , *l* 5 , and *d* $5\ 9\ \mu$, $80\ \mu$ and $3\ \mu$ long. Setae *h* $39\ \mu$.

Host and locality: (1) On *Myotis adversus moluccarum*, Aouta Plantation, Aore Is., New Hebrides. Bat in BM No. 1404. 11-13. Holotype and one paratype female, allotype and three paratypes male. Holotype in BM; (2) On *Myotis adversus*, Pangandaran, Java. Bat in BM No. 9.1.5.1979.82 (three females).

Remark: This species differs from *O. eptesicus* Fain, 1970 by the smaller size of body ($294\ \mu$ for $351\ \mu$), the relatively smaller size and the greater number of the punctate bands on the cuticle, the much smaller length of coxae II.

3. *Olabidocarpus kelantanensis* Fain, 1976

Female (Fig. 5): Holotype $333\ \mu$ long, $98\ \mu$ wide. There are 35 striations (between setae *sc e* and *l* 5). Cuticle without punctations or scales. Postscapular plates and cuticular crest $48\ \mu$ and $115\ \mu$ long respectively. The crest bears 85 striations very close to each other. Coxae II very poorly developed. Setae *sh* $50\ \mu$, *h* $55\ \mu$, *d* $5\ 60-70\ \mu$, *l* $5\ 80\ \mu$. Apical spines of tarsi III and IV ending in a very thin and long (15 to $20\ \mu$) prolongation.

Male: unknown.

Host and locality: On *Tadarida johorensis*, Pulau, Malaya. Bat in BM No. 73.632-51. Holotype and only known specimen in BM.

Remark: The coxae II are very poorly developed as in the other species living on Molossidae. This

species differs from *O. octomops* Fain, described from Africa, by the greater length of the crest (115 μ , for 75 μ in *O. otomops*) and the greater number of striations on the crest (85, for 40 in *O. otomops*.)

4. *Olabidocarpus belsorum* (van Eyndhoven, 1940)

This species has been recorded from *Myotis* spp. in Europe, Central Africa and South America. We found one female specimen on *Myotis taiwanensis*, from Lake Palu Tibet. Bat in BM No. 15.2.21.3.

5. *Olabidocarpus myoticola* Fain, 1970

This species was known from *Myotis nigricans* and *M. albescens*, from S. America. We attribute to this species one female, one male and nymphs collected by Dr. F. Lukoschus from *Myotis* sp. in Gombak Forest, Selangor, Malaysia (24.V.1979). Bat in collection of Institute for Medical Research, Kuala Lumpur, Malaysia.

In this species the setae *sh* are absent and all the cuticular striations bear numerous small sclerotized scales between setae *sce* and *l 5*.

Genus *Dentocarpus* Dusbabek & Cruz, 1966

Definition: In both sexes the tarsi III and IV bear a sucker peduncle but have no terminal sucker. The posterior border of the prescapular plate presents four lobes, two paramedian conical and two laterals rounded, (except in *D. notopteris* in which only the paramedian lobes are present). Cuticular crest absent. In the type species (*D. silvai*) there is a median postscapular plate wider than long and bearing the setae *sci* and *sce*, but in other species this plate may be either median and very small, or replaced by two small paramedian plates, or completely absent. Setae *h* and *l 5* long, *d 5* and *sh* generally long; the *sh* are absent in *D. borneoensis*.

Type species: *Dentocarpus silvai* Dusbabek & Cruz, 1966.

This genus *Dentocarpus* is represented by 16 species of which eight occur on neotropical bats, three on afrotropical bats and five on oriental bats. One species is represented in both Central Africa and Australia. Six species have been found on

Molossidae (four in S. America, one in Africa and one in Asia) four on Emballonuridae, two on Phyllostomatidae, two on Pteropidae, one on Vesperilionidae and one on Rhinolophidae.

The taxon *Paradentocarpus* Fain, 1976, described as a subgenus of *Dentocarpus*, is considered here as a synonym of *Labidocarpellus*. It comprises three species, *P. abyssinicus* Fain, 1976 from Ethiopia, *P. phyllodermae* Fain, 1976 from South America, and *P. kimberleyensis* Fain & Lukoschus, 1981 from Australia.

We have given keys to the afrotropical and neotropical species in previous papers (Fain, 1971 and 1973). We give here a key to the oriental species.

Key to the oriental species of *Dentocarpus* (females)

(N.B. The female of *D. taphozous* Fain is unknown)

1. Setae *sh* completely lacking. Prescapular plate and coxae I-II with longitudinal ridges. Coxae I-II very large and rectangular
 *D. borneoensis* Fain, 1979
 Setae *sh* well developed. Prescapular and coxal I-II plates without longitudinal ridges. Coxae I-II small, not rectangular. 2
2. Postscapular plates straight, very short (24 μ long), not bearing setae *sce*
 *D. novaeguineae* (Fain, 1976)
 Postscapular plates in inverted-L, bearing setae *sce*. 3
3. Seta *d 5* 45 μ long. Body narrow (4.5 times as long as wide). Longitudinal part of postscapular plate poorly sclerotized 25 μ long. Posterior border of prescapular plate with 4 lobes
 *D. orientalis* Fain, 1976
 Seta *d 5* thin, 10 μ long. Body wider (less than 4 times as long as wide). Longitudinal part of postscapular plate strongly sclerotized and 48 μ long. Posterior border of prescapular plate with only the 2 paramedian lobes
 *D. notopteris* (Fain, 1976)

1. *Dentocarpus taphozous* Fain, 1972

This species is known only from the male.

Male (Fig. 6): Holotype 230 μ long, 90 μ wide.

Posterior border of gnathosoma with two wide truncate paramedian lobes. The posterior border of prescapular plate bears four lobes: two strong triangular paramedian and two smaller, more rounded lateral. Postscapular plates in the shape of an inverted-L, bearing setae *sc i* and *sc e*. Opisthosomal plate 22 μ long, with posterior margin straight. There are 16 to 18 cuticular striations between setae *sc e* and opisthosomal plate. Tarsi III-IV with an apical spine very finely attenuated apically. Posterior margin of body with four pairs of setae, one long (the seta is lost but its insertion base is very large) and three short. Sucker peduncle of tarsus IV about twice as long as the ventral spine of this tarsus. Seta *h* 50–60 μ , *sh* 60 μ .

Host and locality: On *Taphozous saccolaimus*, Java. Bat in the IRSNB. Holotype and four paratypes male. Holotype in IRSNB.

2. *Dentocarpus orientalis* Fain, 1976

Male (Fig. 9): Holotype 225 μ long, 80 μ wide. Gnathosoma with four strong posterior conical lobes. Prescapular plate with four lobes, two paramedian long and pointed and two lateral small and rounded. Postscapular plates small, shaped in inverted-L.

There are 23 striations between setae *sc e* and opisthosomal plate. Opisthosomal plate 25 μ long. Setae *h* at least 55 μ , *sh* at least 25 μ . Posterior margins of body with four pairs of setae: *d 4* 30 μ , *l 5* 48 μ , *d 5* 25 μ , *a* 16 μ long respectively, from dorsum to venter. Sucker peduncle of tarsi III and IV strongly developed, thick and longer than corresponding tarsi.

Female (Figs. 8): Allotype 315 μ long, 70 μ wide. Gnathosoma and scapular plates as in the male but the posterior lobes on gnathosoma and prescapular plate are smaller. There are 43 striations between setae *sc e* and anus. Setae *h* 70 μ , *sh* 40 μ , *d 5* 45 μ .

Host and locality: On *Tadarida (Chaerephon) johorensis*, Pulau, Kelantan, Malaysia. Bat in BM. No. 73.632–51. Holotype male, three paratypes female. The mites were attached to the hairs of the body. Holotype in BM.

Remark: This species is close to *D. chaerephon* Fain. It differs in both sexes by the much smaller size of the body and the greater size of the lobes on the

posterior margins of gnathosoma and prescapular plate. The male differs by the shorter opisthosomal plate and shorter *l 5* setae (48 μ , for 120 μ in *D. chaerephon*); the female differs by the shorter *sc e*, *sc i*, *h*, *sh*, *d 5* and *l 5* setae.

3. *Dentocarpus novaeguineae* (Fain, 1976) n.comb.

Labidocarpellus novaeguineae Fain, 1976, p. 51

Female (Fig. 7): Holotype (larvigerous) 366 μ long, 90 μ wide. Prescapular plate 45 μ long in midline, 54 μ long along paramedian lobes, with two triangular paramedian lobes on its posterior border. Postscapular plates straight 24 μ long. There are 50 cuticular striations between seta *sc e* and anus. Setae *h* 85 μ , *sh* 18 μ , *d 5* 75, *l 5* 75 μ . Apical spine of tarsus IV 18 μ long.

Host and locality: On *Nyctimene albiventer papuanus*, Kairuru Is., New Guinea. Bat in BM No. 73.2016–25. Holotype and only known specimen, in BM.

4. *Dentocarpus borneoensis* Fain, 1979

Female (Fig. 10): Holotype 345 μ long, 90 μ wide. In one paratype 342 \times 108 μ . Gnathosoma with two small triangular posterior paramedian plates. Prescapular plate reinforced by two longitudinal paramedian ridges and with posterior margin bearing four triangular lobes, two paramedian and two lateral. This plate is 70 μ long (measured along the paramedian lobes) and is not fused with the coxae I-II. Postscapular plates absent. There are 34 striations between seta *sc e* and anus. Coxae I and II very large with two longitudinal ridges. Setae *sc i* 45 μ , *sc e* 70 μ , *h* 75 μ , *sh* lacking, *d 5* 65 μ , *l 5* 120 μ .

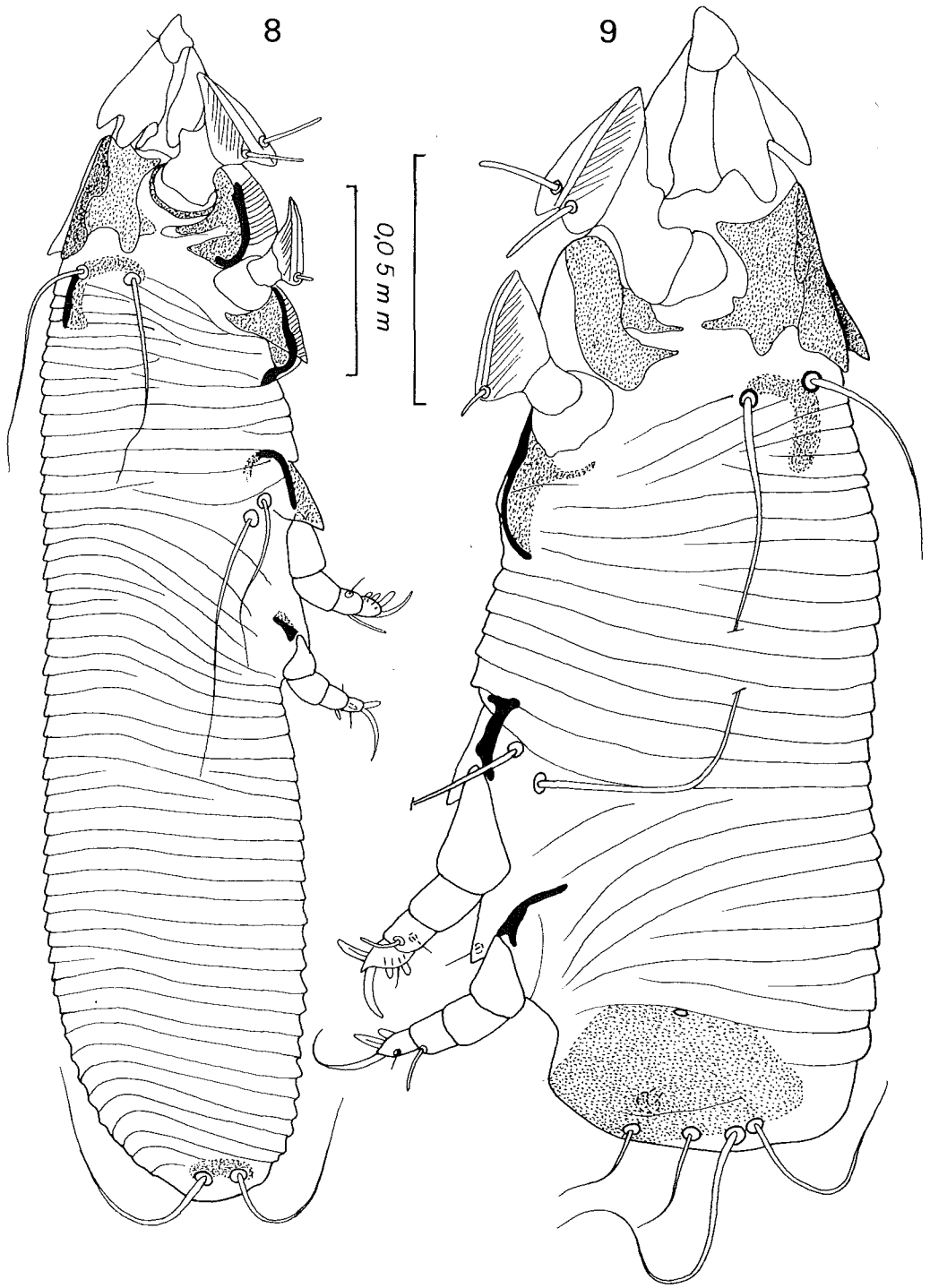
Male (Fig. 11): 240 μ long and 100 μ wide (in bad condition). Gnathosoma, prescapular plates and coxae I-II as in female. Opisthosomal plate 39 μ long. There are four pairs of setae on posterior margin of body, two very short, one longer, and one (*l 5*) 110 μ long.

Host and locality: We have found females of this species on two different hosts *Rhinolophus c. craighi*, from Comanton Cave, Borneo (bat in BM No. 72.681–708) (holotype and five paratypes female, and two male paratypes) and on *Pteropus admiralitatum* from Solomon Is. (bat in BM No. 67.1919) (2 males). New specimens should be found before we

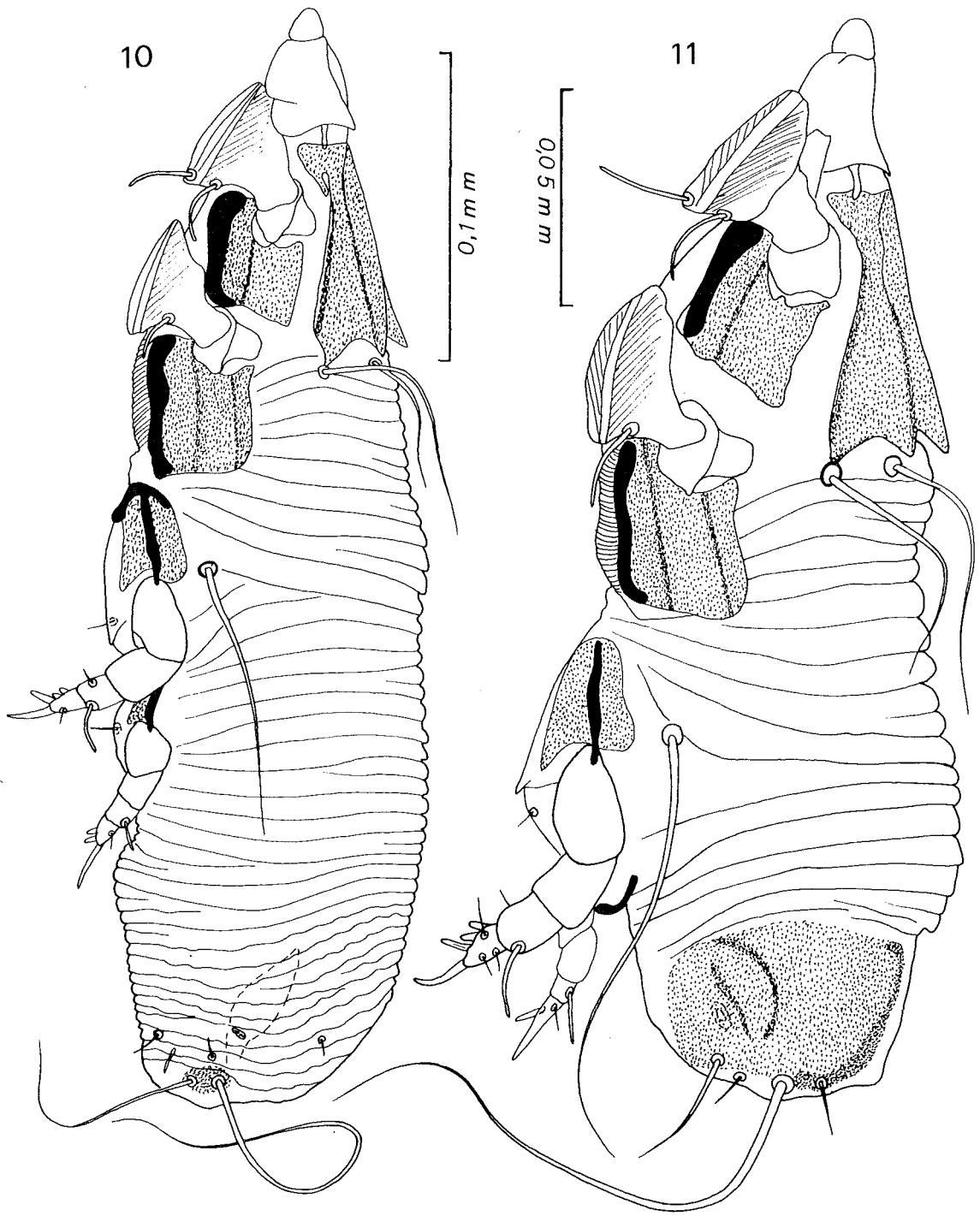


Fig. 6. *Dentocarpus taphozous* Fain. Male, holotype.

Fig. 7. *Dentocarpus novaeguineae* (Fain). Female, holotype.

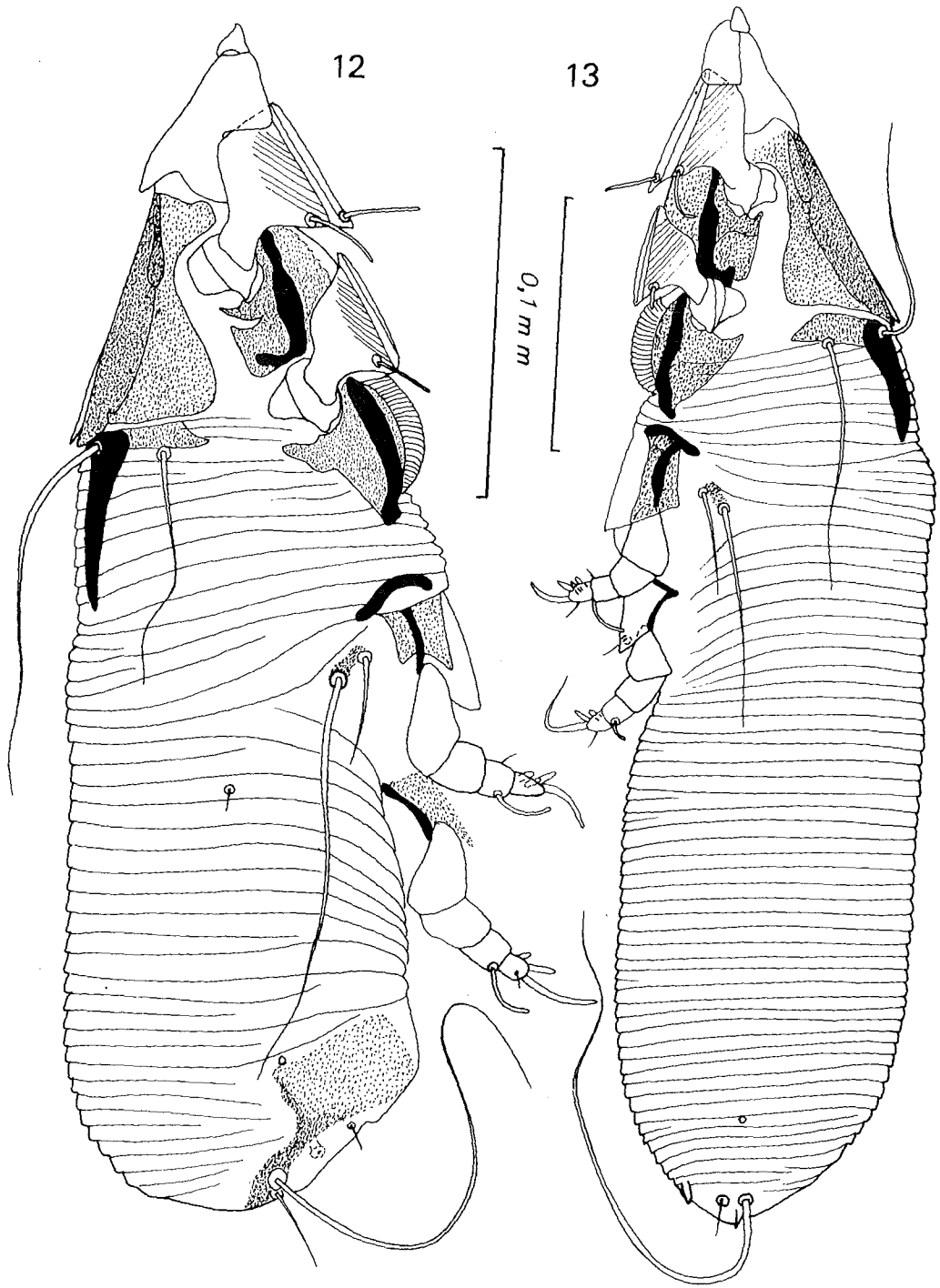


Figs. 8-9. *Dentocarpus orientalis* Fain. Fig. 8. Female. Fig. 9. Male, holotype.



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Figs. 10-11. *Dentocarpus borneoensis* Fain. Fig. 10. Female, holotype. Fig. 11. Male.



Figs. 12-13. *Dentocarpus notopteris* (Fain). Fig. 12. Male. Fig. 13. Female, holotype.

can ascertain the true host of this species. Holotype in BM.

5. *Dentocarpus notopteris* (Fain, 1976) n.comb.

Labidocarpellus notopteris Fain, 1976, p. 52

Female (Fig. 13): Holotype 489 μ long, 133 μ wide. Gnathosoma and prescapular plate with two triangular posterior paramedian lobes. Prescapular plate 90 μ in midline. Postscapular plates in the shape of inverted-L, bearing the *sc e* and *sc i* setae. Setae *h* 100 μ , *sh* 33 μ , *d 5* 10 μ , *l 5* 210 μ .

Male (Fig. 12): Allotype 339 μ long, 119 μ wide. Gnathosoma, prescapular and postscapular plates as in female. Prescapular plate not fused with coxae I-II. Opisthosomal plate very poorly developed. Setae *d 5* 18 μ , *l 5*, 150 μ .

Host and locality: On *Notopteris macdonaldi*, Tanna Is., New Hebrides. Bat in BM No. 25.12.14.11-12. Holotype and 3 paratypes female. Allotype and 1 paratype male. Holotype in BM.

Remark: This species is characterized in both sexes by the shape (with two lobes) of the prescapular plate and the great development of the postscapular plates; the male differs by the small development of the opisthosomal plate, which is almost vestigial.

Genus *Labidocarpellus* Fain, 1976

Dentocarpus (*Paradentocarpus*) Fain, 1976 new synonym

In this genus the tarsi III-IV in both sexes end in a well-developed sucker-peduncle but the sucker itself is lacking. The prescapular plate has no posterior paramedian hooks but is concave in midline except in one species, *L. abyssinicus*, where the posterior margin is straight. There are two longitudinal paramedian and narrow postscapular plates, either straight or in an inverted-L. There is no cuticular crest in the midline behind the prescapular plate. Coxae II poorly developed (except in *L. abyssinicus*). Cuticle without punctate or striated bands except in *L. peropteryx* and *L. guyanensis*.

Type species: *Labidocarpellus nyctimene* Fain, 1976

Remarks: (1) *Labidocarpellus* is close to *Olabidocarpus* Lawrence and *Dentocarpus* Dusbabek & Cruz. It differs from the first genus by the complete

absence of postscapular crest and the poor development of coxae II. It is distinguished from *Dentocarpus* by the shape of posterior border of prescapular plate which is devoid of paramedian lobes. (2) We think now that *Labidocarpellus notopteris* Fain, 1976 and *L. novaeguineae* Fain, 1976 do not belong to *Labidocarpellus* and we transfer these species to *Dentocarpus*. (3) The subgenus *Dentocarpus* (*Paradentocarpus*) Fain, 1976 (type species *D. (P.) abyssinicus* Fain) is considered here as a synonym of *Labidocarpellus*, thus the three species described so far in this taxon (*D. (P.) abyssinicus* Fain, 1976, *D. (P.) phyllodermae* Fain, 1976 and *D. (P.) kimberleyensis* Fain and Lukoschus, 1981) are now transferred to the genus *Labidocarpellus*. (4) The species *Olabidocarpus peropteryx* Fain, 1972 and *O. guyanensis* Fain, 1972 are transferred to *Labidocarpellus*.

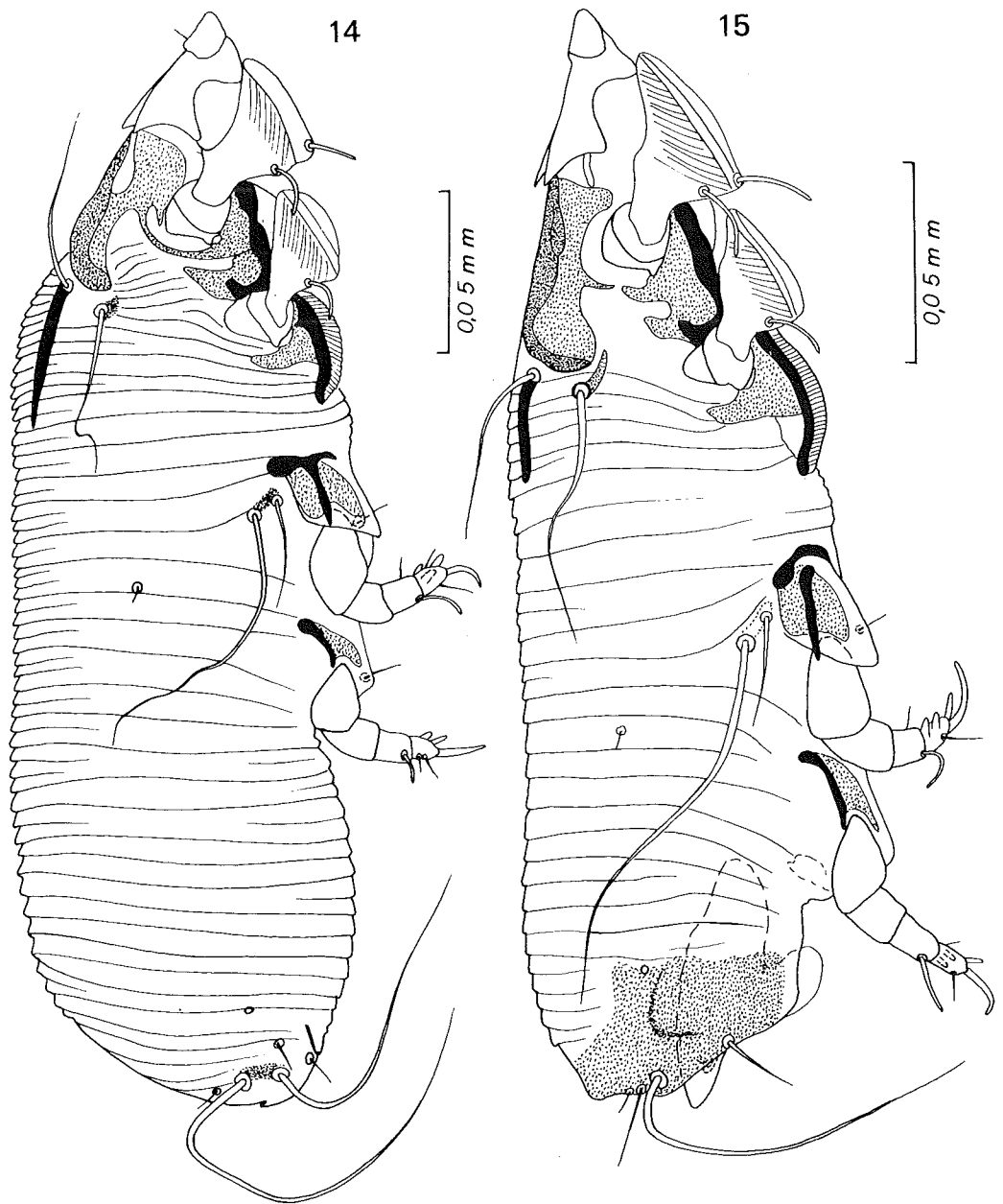
After these transfers, the genus *Labidocarpellus* now comprises 11 species. A key to this genus is given below.

Key to the known species of *Labidocarpellus* (females)

(N.B. *L. selangorensis* known only from the male, is not mentioned here).

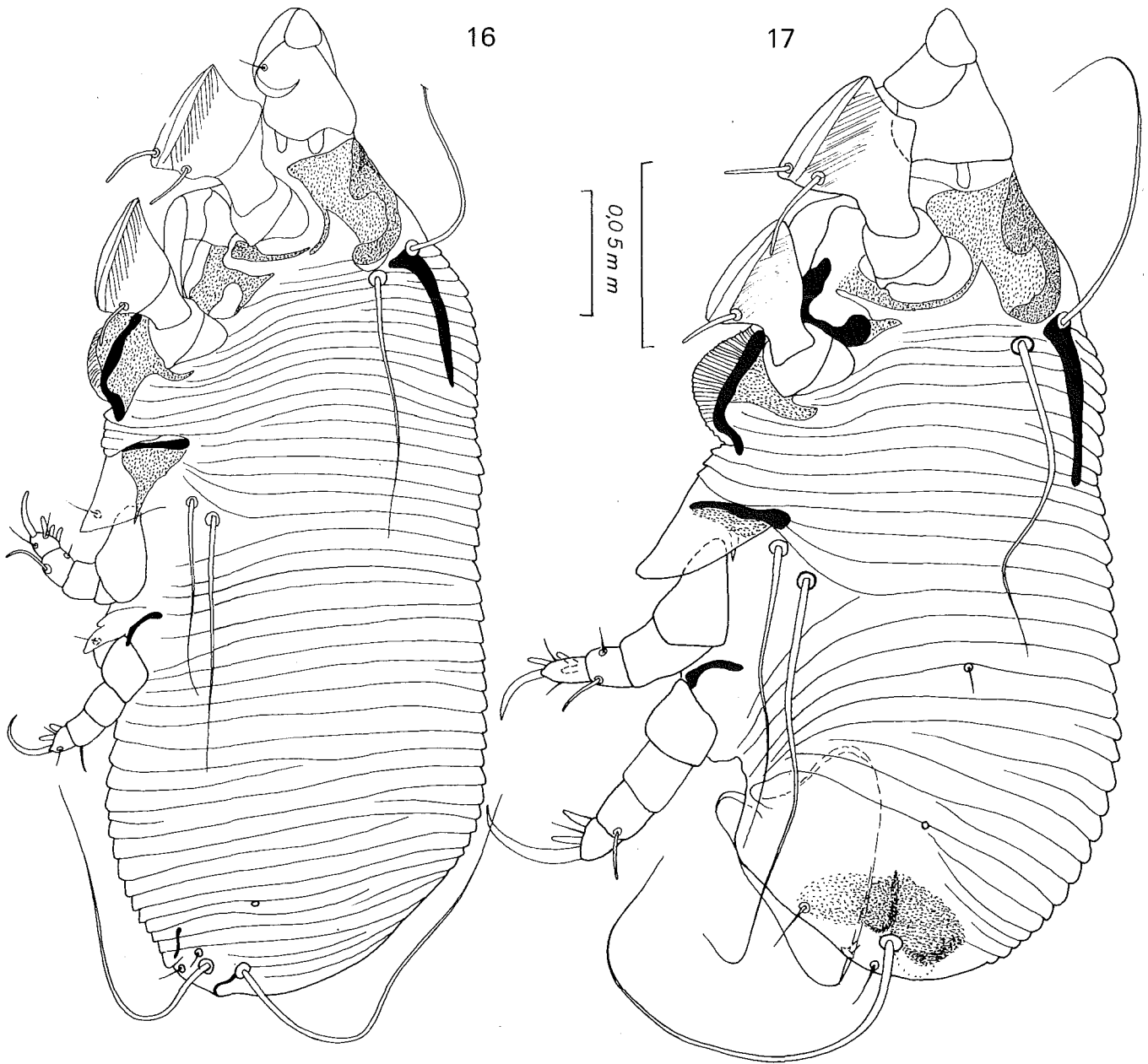
1. Setae *l 5* approximately 7.5 to 12 times as long (75 to 80 μ) as setae *d 5* (6 to 10 μ). Body 255 to 263 μ long with 23 to 25 striations (between *sc e* and *l 5*). On *Peropteryx kappleri*. Brazil. . . . 2
 Setae *l 5* less than twice as long as *d 5* 3
2. In both sexes: posterior border of gnathosoma straight, without lobes. Lateral surface of body with distinct punctate transverse and relatively narrow bands. In the male, the trochanters III and IV bear a long lateral sclerotized lobe. . . .
 *L. peropteryx* (Fain, 1972)
 In both sexes: posterior border of gnathosoma with two well-developed paramedian lobes. Lateral surface of body with poorly distinct wider bands with very faint and short longitudinal striations. Lateral lobes of trochanters III-IV in male small.
 *L. guyanensis* (Fain, 1972)
3. Posterior border of prescapular plate straight.

1976 Fain



Figs. 14–15. *Labidocarpellus nyctimene* Fain. Fig. 14. Female, holotype. Fig. 15. Male.

- Body 540 μ long. Postscapular plate slightly in inverted-L and 30 μ long. Coxa II relatively well-developed. Setae *h* and *sh* more than 100 μ long, *d 5* 135 μ , *l 5* more than 150 μ . On *Otomops martiensseni*.
 *L. abyssinicus* (Fain, 1976)
 Posterior border of prescapular plate distinctly concave. 4
4. Setae *sh* almost vestigial (3 μ long) 5
 Setae *sh* 12 to 80 μ long. 6
5. Postscapular plate almost vestigial 9 to 10 μ long. Body 385 μ long, with 32 cuticular striations between setae *sc e* and *l 5*. On *Phylloderma stenops*. British Guyana
 *L. phyllodermae* (Fain, 1976)
 Postscapular plate 27 μ long, fused with prescapular plate. Body 405 μ with 47–50 cuticular striations between setae *sc e* and *l 5*. On *Chrotopterus auritus*. Brazil
 *L. chrotopterus* (Fain, 1976)
6. With only 23 widely spaced cuticular striations between setae *sc e* and *l 5*. Body 420 μ long. Postscapular plates 60 to 66 μ long. Setae *sh* 36 μ *h* 60 to 65 μ . On *Cynopterus brachyotis altitudinis*. Malaysia
 *L. cynopterus* Fain, 1976
 With 30 to 50 cuticular striations close together between *sc e* and *l 5*. 7
7. Body 500 μ long with postscapular plate straight 108 μ long. Setae *h* and *sh* 120 to 150 μ ; *d 5* and *l 5* 200–250 μ . On *Dobsonia moluccensis*: Papua
 *L. dobsonia* (Fain, 1975)
 Body 210 to 390 μ long. Postscapular plate 25 to 60 μ long. Setae *sh* 12–80 μ , *d 5* 45 to 100 μ , *l 5* 70 to 160 μ 8
8. Body 210 to 279 μ long, with postscapular plate in an inverted-L, 25 μ long. Setae *d 5* 45 μ long, *sh* 12 to 15 μ , *h* 36 μ . On *Eptesicus douglasi*. Australia
 *L. kimberleyensis* (Fain & Lukoschus 1981)
 Body 310 to 390 μ long. Postscapular plate 39 to 60 μ long. Setae *d 5* 100 μ , *h* 90 to 115 μ long 9
9. Postscapular plates 39 to 45 μ long. Setae *sh* 18 to 21 μ , *h* 90 to 100 μ . Body 312 μ long. On *Nyctimene albiventer papuanus*. New-Guinea.
 *L. nyctimene* Fain, 1976
- Postscapular plates 60 μ long. Setae *sh* 70–80 μ , *h* 100–115 μ . Body 390 μ long. On *Eonycteris spelaea*. Malaysia
 *L. eonycteris* Fain, 1976
1. *Labidocarpellus nyctimene* Fain, 1976
Female (Fig. 14): Holotype 312 μ long and 108 μ wide. In two paratypes: 340 μ \times 115 μ , 330 μ \times 105 μ . Posterior border of gnathosoma with two relatively strong and thick paramedian conical lobes. Prescapular plate 39 μ long in midline, 49 μ long laterally (maximum length). Postscapular plates 39 to 45 μ long. There are 32 cuticular striations along a lateral line between seta *sc e* and anus. Setae *h* 90 to 110 μ , *sh* 18 μ . The *sc e* are situated on soft cuticle. Posterior extremity of body with two pairs of long and three pairs of very short setae. Coxa II poorly developed.
Male (Fig. 15): Allotype 265 μ long and 90 μ wide. Gnathosoma with two conical paramedian lobes on its posterior border. Prescapular plate 39 μ long in midline, 48 μ laterally (maximum length). Postscapular plate 30 μ long. There are 18 cuticular striations between setae *sc e* and posterior plate. Opisthosomal plate 31 μ long (maximum). Posterior margin of body with three pairs of setae, the longest 90 μ long. Adanal suckers very small. Setae *h* 90 μ , *sh* 21 μ .
Host and locality: (1) *Nyctimene albiventer papuanus*, Kairuru Is., New-Guinea. Bat in the BM No. 73.2016–25. Holotype and five paratypes female, one paratype male. The mites were fixed on the hairs of the head. Holotype in BM; (2) *Nyctimene major geminus*, Schouten Is., Papua. Bat in BM No. 75.1861-62. one female paratype; (3) *Nyctimene aello aello*, East of Kairuru Is. near Wewa. Bat in BM No. 73.2035-6, 12 females and three males, paratypes; (4) *Nyctimene draconilla* Sth-E. of Ravit, Papua. Bat in BM No. 73–2029; two paratypes female; (5) *Nyctimene bougainvillei*, Buin, Bougainville Is. Bat in IRSNB No. 6343: one female paratype.
Remark: This species is distinguished from *L. dobsonia* (Fain, 1975) by the much smaller size of the body and shorter setae and by the shape of the prescapular plate, whose posterior border is much less excavated in the midline.



Figs. 16-17. *Labidocarpellus eonycteris* Fain. Fig. 16. Female, holotype. Fig. 17. Male.

2. *Labidocarpellus eonycteris* Fain, 1976

Female (Fig. 16): Holotype (larvigerous) 390 μ long, 150 μ wide. In two paratypes 435 μ \times 160 μ (larvigerous) and 380 \times 145 μ . Prescapular plate 33 μ long in midline and 51 μ laterally. Postscapular plates 60 μ long. There are 41 striations laterally between seta *sc e* and anus. Posterior border of gnathosoma sinuous, without true lobes. Seta *h* and *sh* incomplete in the type: in a paratype they are 115 and 75 μ long respectively.

Male (Fig. 17): Allotype 250 μ long, 120 μ wide. Lengths of plates: prescapular 27 μ in midline and 42 μ laterally, postscapulars 45 μ , opisthosomal 25 μ . Setae *sc i* 90 μ , *sc e* 85 μ , *h* 110 μ , *sh* 75 μ . Posterior border of body with three pairs of setae, the longest being 120 μ long.

Host and locality: On *Eonycteris spelaea*, Gunong, Pandak, Perak, Malaysia. Bat in BM, Doyle Coll. 8.II.1969. Holotype and four paratypes female, five male paratypes. The mites were fixed to the hairs of the head and the shoulders. From the same host from Raub Cave, Pahang, Malaysia, 13.V.1979 (bat collected by Rudnick, mites collected by Dr. Lukoschus) five females and four males.

Remark: This species is close to *L. nyctimene*. It differs from it by the length of the *sh* setae which are relatively much longer than the *h* setae and the different shape of the postscapular plate.

3. *Labidocarpellus selangorensis* Fain, 1976

This species is known only from the male.

Male (Fig. 18): Holotype 298 μ long, 130 μ wide. Gnathosoma with two broad paramedian lobes. Prescapular plate 35 μ long in midline and 48 μ laterally. Postscapular plate 56 μ long. Opisthosomal plate 36 μ long, 70 μ wide. There are 26 to 28 cuticular striations between *sc e* and opisthosomal plate. Setae *h* 120 μ , *sh* 50 μ . Posterior border of body with three pairs of setae, the longest is at least 90 μ long (incomplete).

Host and locality: On *Dyacopterus spadiceus*, Selangor, Malaysia. Bat in BM No. 60.738. Holotype, and only known specimen, in BM.

4. *Labidocarpellus cynopterus* Fain, 1976

This species is only known from the female.

Female (Fig. 19): Holotype 420 μ long, 135 μ wide.

In a larvigerous paratype 450 \times 142 μ . Posterior margin of gnathosoma straight. Prescapular plate 60 μ long in midline and 74 μ long laterally. Postscapular plates 60 to 66 μ long. There are 23 widely spaced cuticular striations between setae *sc e* and anus. Setae *h* 60 μ , *sh* 36 μ . Setae *l 5* 120 μ *d 5* 90 μ . Apical spine of tarsus IV 39 μ long.

Host and locality: On *Cynopterus brachyotis altitudinis*, Pahang, Gunong, Cameron Highlands, Malaysia. Bat in BM No. 62.861–869 (not No. 73.1319–20 as given in the original description). Holotype and three paratypes female. Holotype in BM.

Remark: This species is characterized by the relatively great size of the body combined with the small number of cuticular striations.

5. *Labidocarpellus dobsonia* (Fain, 1975)

Pteropiella dobsonia Fain, 1975, p. 185; *Labidocarpellus dobsonia* Fain, 1977, p. 296 (Figs. 23–25–28)

This species is only known from females.

Type host and locality: *Dobsonia moluccensis*; Javare, central District, Papua. Holotype in Bishop Museum, Honolulu, U.S.A.

Genus *Pteropiella* Fain, 1970

This genus is characterized in both sexes, by the presence of two pairs of punctate paramedian plates in anterior part of the dorsum: a pair of prescapular and a pair of postscapular, the latter being in the shape of narrow longitudinal sclerotized plates. The sucker peduncle on tarsi III-IV is very small or absent.

Type species: *Pteropiella pteropi* Fain, 1970.

1. *Pteropiella pteropi* Fain, 1970

Female (Fig. 20): Holotype 630 μ long, 240 μ wide. There are two prescapular paramedian plates 80 μ long. Postscapular plates 85 μ long. There are 49 striations in midline. Setae *sc i* at least 130 μ , *sc e* 160 μ , *h* and *sh* long, badly orientated, *d 5* and *l 5* 250 μ . Apical spine of tarsi III and IV 38 to 40 μ .

Male (Fig. 21): Length 465 μ long, 245 μ wide. Prescapular and postscapular plates 80 μ long. The postscapular plate is straight. Opisthosomal plate

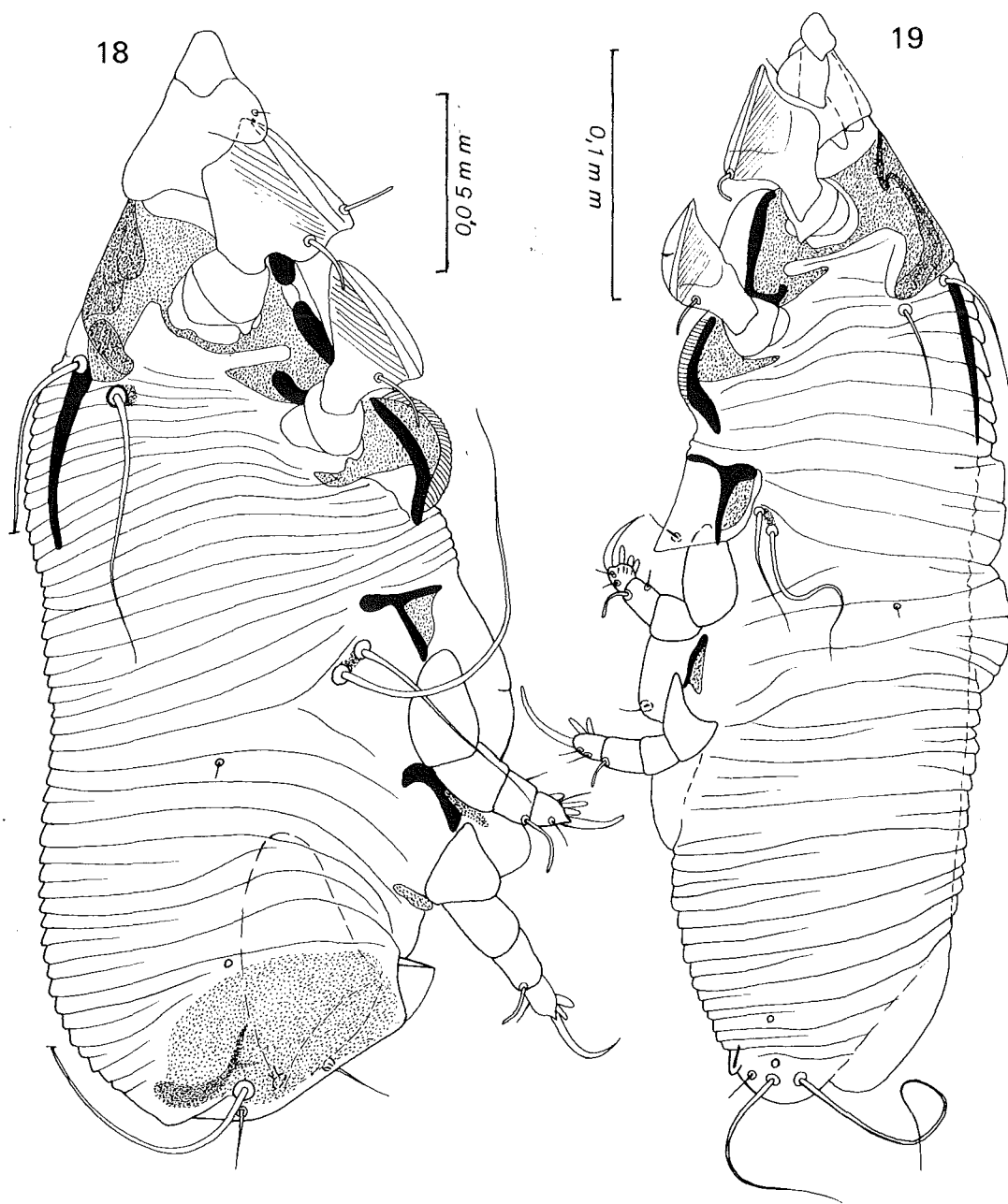
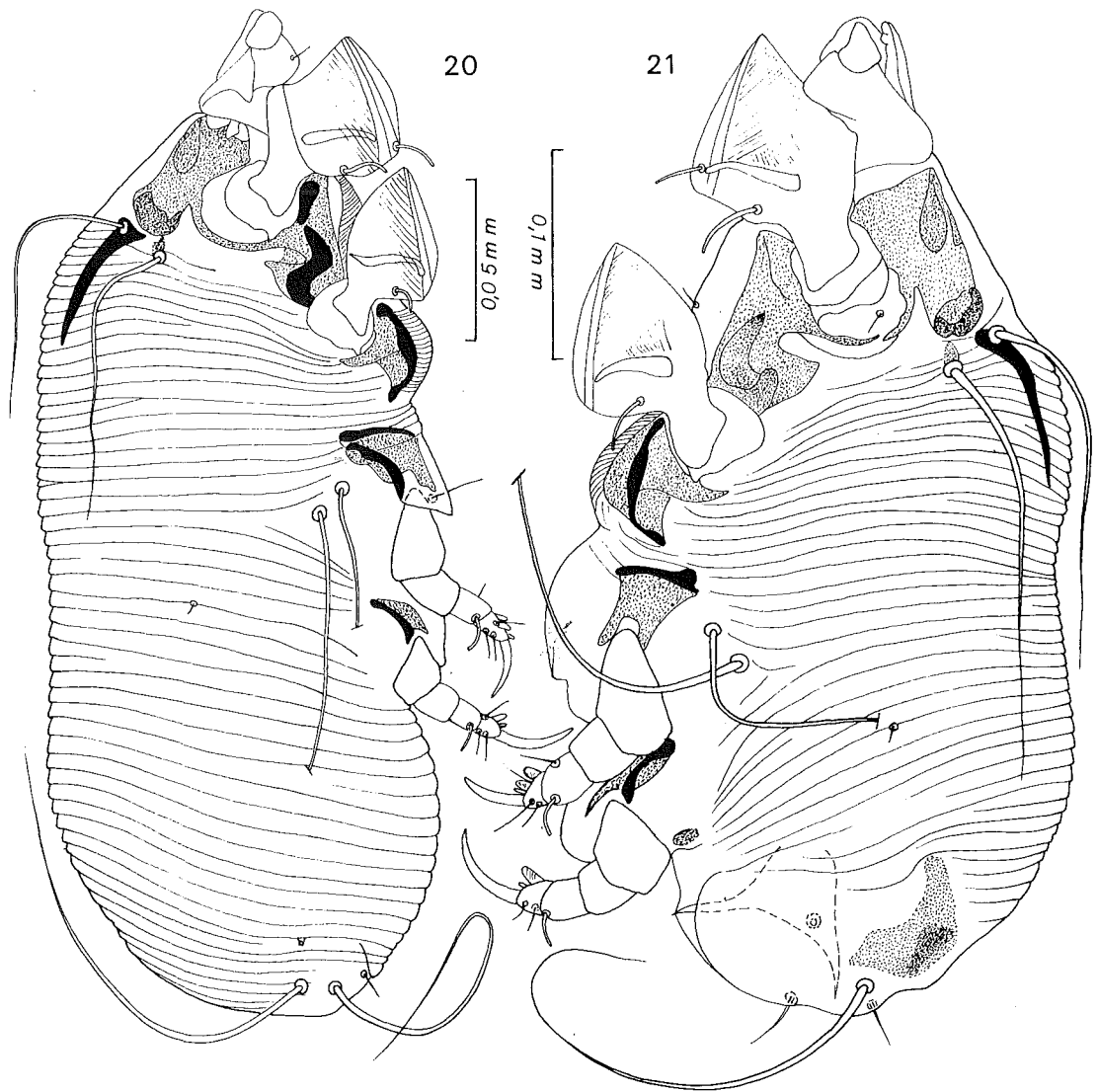
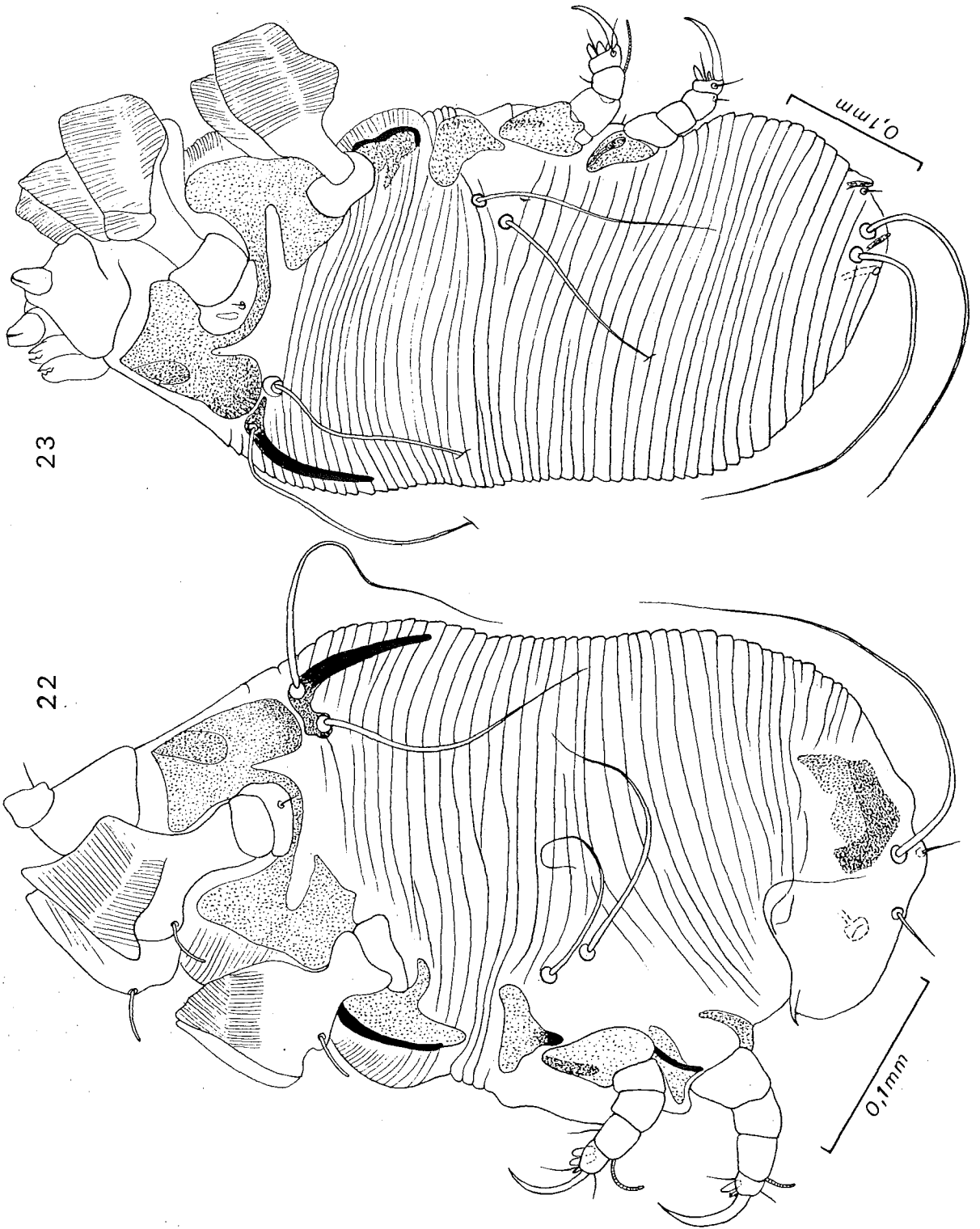


Fig. 18. *Labidocarpellus selangorensis* Fain. Male, holotype.
Fig. 19. *Labidocarpellus cynopterus* Fain. Female, holotype.



Figs. 20–21. *Pteropiella pteropi* Fain. Fig. 20. Female, holotype. Fig. 21. Male.



Figs. 22-23. *Pteropiella papuana* Fain. (Figures from Fain, 1977, after correction) Fig. 22. Male. Fig. 23. Female.

57 μ long, more or less L-shaped. Posterior border of body with three pairs of setae, the longest being 280 μ long. There are 31 striations between setae *sc e* and the opisthosomal plate. Apical spine of tarsi III 40 μ , of tarsi IV 48 μ .

Host and locality: (1) *Pteropus rufus*, Nossi-bé (Madagascar). Bat in the IRSNB. Holotype in MRAC; (2) *Pteropus giganteus*, locality not known, probably India (bat in IRSNB since 1880) four females, three males, nymphs and larvae.

2. *Pteropiella papuana* Fain, 1975

Labidocarpellus papuanus Fain, 1977, p. 295, Figs. 23–25, 26.

This species has been redescribed and depicted for the first time from both sexes, and transferred to the genus *Labidocarpellus* (Fain, 1977). A new study of *Pteropiella papuana* and *P. pteropi* has shown that both species belong to the genus *Pteropiella*. The drawings given previously for *P. papuana* (Fain, 1977) should be corrected for the prescapular plates. There are, in fact, two separate plates and not one strongly excavate plate as depicted. I give here new corrected drawings for female and male of *P. papuana*. (Figs. 22–23).

P. papuana is very close to *P. pteropi*. It differs from it in the female by the shorter apical spines of tarsi III-IV and the longer prescapular and postscapular plates (96 and 90 μ , for 80 and 85 in *P. pteropi*). The male differs in the longer body, the different shape of the opisthosomal plate, which is not in an inverted-L, and of the postscapular plate, which is L-shaped.

Host and locality: The true host is unknown, probably *Dobsonia* sp. or *Pteropus* sp., from Irian. *Pteropiella* is now thought to be specialized for the genus *Pteropus* and therefore the true host of *Pteropiella papuana* is more likely to be a bat of this genus.

Taxa insufficiently known

Genus *Eulabidocarpus* Lawrence, 1948

This genus was erected for the species *Labidocarpus compressus* Ewing, 1910 found on *Pteropus edwardsii* in Ceylon.

According to the original description and photomicrograph, this species seems to belong to the family Chirodiscidae: however, it does not agree exactly with the genera represented so far in the Pteropidae (e.g., *Alabidocarpus*, *Labidocarpellus* and *Pteropiella*). *E. compressus* was shown to have a deep transverse sejugal furrow and abnormally long setae on the scapular region and on the opisthonotum at some distance from the posterior extremity. These characteristics have not been observed in any other species of Chirodiscidae described from bats. Unfortunately, the types of *E. compressus* have been lost (McDaniel & Lawrence, 1968) and it is no longer possible to compare this species with the other species described in this family.

E. compressus (Ewing) is 440 μ long and 220 μ wide, but the sex of this specimen was not stated by Ewing.

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* *Erratum*: Please note that in this paper p. 138, line 25 should read '*Asiolabidocarpus megadermae* Fain, 1972' not '*Asiolabidocarpus hipposideros* Fain, 1972'.