

# LABIDOCARPID BAT-MITES OF VENEZUELA (LISTROPHOROIDEA: LABIDOCARPIDAE)

by

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## ABSTRACT

Nine species of bat-mites representing six genera of the family Labidocarpidae are recorded from Venezuela. The genus *Pseudoalabidocarpus* is described as new and contains a single species, *P. secus*, new species, collected from *Phyllostomus elongatus* and *P. discolor*. Two other new species are described: *Lawrenceocarpus phyllostomus*, new species, collected from *Phyllostomus elongatus* and *Micronycteris hirsuta*; and *Labidocarpus dossuarius*, new species, collected from *Molossus major*. New distribution and host records from Venezuela include: *Ala-*

*bidocarpus furmani* on *Glossophaga longirostris*, *Carollia perspicillata*, *C. brevicauda*, *Vampyrops helleri*, *Anoura caudifera* and *Pteronotus parnellii*; *A. nicaraguae* on *Uroderma magnirostrum*; *A. jonesi* on *Vampyrops helleri*; *Parakosa tadarida* on *Noctilio labialis*, *Glossophaga longirostris*, *Carollia brevicauda*, *Sturnira lilium*, *Molossus ater* and *Molossus bondae*; *Parakosa maxima* on *Noctilio labialis*, *Glossophaga longirostris*, *Artibeus harti*, *Molossus ater*, *M. bondae* and *M. major*.

## INTRODUCTION

The first labidocarpid bat-mite recorded from the neotropical realm was collected in Mexico by McDaniel in 1962. Since that date several records of bat-mites have been established from Trinidad (Pinichpongse, 1963 *b,c,d*), Cuba (Dusbábek and Cruz, 1966), Nicaragua (McDaniel, 1970), and Venezuela (Fain, 1970). The latter work by McDaniel (1970) listed additional records from Puerto Rico, Peru, Ecuador, and Venezuela.

Information is almost nonexistent on species of the family Labidocarpidae that occur in

South America. The present work is based on a collection made by personnel under the direction of Doctors Vernon J. Tipton, Professor of Zoology, Brigham Young University, and Charles O. Handley, Jr., Curator of Mammals, U. S. National Museum of Natural History, Smithsonian Institution, with the aid of Department of the Army contract DA-40-193-MD-2788 (Ecology and distribution of mammalian ectoparasites, arboviruses, and their hosts in Venezuela).

## SPECIES IN THE SMITHSONIAN VENEZUELAN COLLECTION

### Genus *Alabidocarpus* Ewing

*Alabidocarpus* Ewing, 1929:188.—Pinichpongse, 1963*b*:266.—McDaniel, 1970:804. — McDaniel and Coffman, 1970:223.

TYPE SPECIES: *Labidocarpus megalonyx* Trouessart, 1895, ex *Rhinolophus ferrum-equinum*.

### *Alabidocarpus furmani* Pinichpongse

*Alabidocarpus furmani* Pinichpongse, 1963*b*:273.—McDaniel, 1970:804.

### REDESCRIPTION

MALE: Body laterally compressed with numerous ( $40 \pm$ ) fine annulations; skin unsclerotized except for gnathosoma, anterior propodoso-

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mal plates, coxal apodemes and opisthosomal plate. Legs I and II highly modified, usual labidocarpid type, i.e., with plates flaplike, dilated distally, adapted for fitting around hair of host. Propodosomal shield well developed, extends to level of leg II with 2 pairs microsetae posterior to propodosomal shield. Setae located near coxa III unequal in size, dorsal pair much larger and longer than ventral pair, ventral pair similar in size and shape to propodosomal setae. Leg III with main single claw shorter than main claw of leg IV, longer than accessory spurs; 2 accessory spurs shorter than accessory spur of leg IV, subequal in size, both with furrowed inner surface, knifelike, with saw-toothed apex. Two prominent setae located on tibia. Leg IV with main claw thicker at base than base of main claw of leg III, longer and curved, with 1 accessory spur. Two prominent setae located on posterior side of last and next to last segments of leg IV. One pair of setae associated with and enclosed within apodemes of legs III and IV. Two pairs setae associated with flaplike clasping portion of legs I and II. Pair located nearest body larger than pair on outer edge of flap. Anal region of body with pair of small anal suckers. Two pairs anal setae, dorsal pair longer than opisthosomal region of body, ventral pair small, located below dorsal pair. Opisthosomal region sclerotized, forms opisthosomal plate. Anal suckers associated with plate. Length (allotype) 645  $\mu$  (592-671), width 300  $\mu$  (275-336), (measured between legs III and IV).

**FEMALE:** Body laterally compressed with numerous (74 $\pm$ ) fine annulations posterior to propodosomal shield. Legs I and II modified as in male. Legs III and IV with same type of main tarsal claws and accessory spurs as male. Propodosomal shield similar to male, 2 pairs minute setae posterior to propodosomal shield, also 1 pair of setae similar in structure on mid-dorsum at level between legs III and IV (these not present on male). Two pairs lateral setae just dorsal to coxa III; dorsal pair long, ventral pair minute. One pair of setae between lateral setae and dorsal margin. One pair of setae between coxae III and between coxae IV, associated with apodemes similar to male. Opisthosoma without opisthosomal plate, with pair of anal setae. Legs I and II with same type setae as male. Legs III and IV subequal, without setae on tarsus IV, with setae on penultimate segment. Length (holotype) 830  $\mu$  (653-903), width 345  $\mu$  (305-390 measured between legs III and IV).

#### VENEZUELAN RECORDS

Two females, 1 copulatory female, 1 male ex *Glossophaga longirostris* (SVP 5588), Apure, 46 km NE

Puerto Paez, Hato Cariben, Río Cinaruco, 76 m elev., 9-XII-65; 3 females, 1 male, 1 nymph, host (SVP 5812), and data as above except 23-XII-65; 7 females, 1 copulatory female, 1 male, hosts (SVP 6261 and 6301) as above, Apure, 38 km NW Puerto Paez. Río Cinaruco, 76 m elev., 19-I-66; 1 female ex *Carollia perspicillata* (SVP 15732), T. F. Amazonas, Río Cunucunuma area, Belén, base of Cerro Duida, 150 m elev., 15-I-67; 2 females, host (SVP 30357) as above, T. F. Amazonas, 32 km SSE Puerto Ayacucho, Raya I, 3 miles SE Coromoto, 135 m elev., 6-IX-67; 1 female, ex *Carollia brevicauda* Carabobo, 9 km NE Montalbán, Cumbre Canabobo, 1245 m elev., 1-XI-67; 2 females, 1 female with hexapod nymph within body, 1 hexapod nymph ex *Vampyrops helleri* (SVP 26828 and 26850), T. F. Amazonas, clearing in front of Catholic Mission, San Juan, Río Manapiare, 155 m elev., 17-VI-67; 1 female, 1 copulatory female, 1 male ex *Anoura caudifera* (SVP 15841), T. F. Amazonas, 6 km SE Belén, Cerro Duida, Cano Culebra, 700 m elev., 16-I-67; 1 female, 1 male ex *Pteronotus parnellii* (SVP 20641), Yaracuy, 8 km N and 18 km W San Felipe (Minas de Aroa), 380 m elev., 18-XII-67.

#### REMARKS

This species was first recorded from Trinidad from *Anoura geoffroyi geoffroyi*. Additional records by McDaniel (1970) extended its distribution to include Mexico and Nicaragua. The records here extend the distribution of *A. furmani* to include South America and adds the following as new host records: *Glossophaga longirostris*, *Carollia perspicillata*, *C. brevicauda*, *Vampyrops helleri*, *Anoura caudifera* and *Pteronotus parnellii*.

#### *Alabidocarpus nicaraguae* McDaniel

*Alabidocarpus nicaraguae* McDaniel, 1970:804.

#### REDESCRIPTION

**MALE:** Body laterally compressed with numerous (37 $\pm$ ) fine annulations; skin transparent except for gnathosoma, propodosomal plate, opisthosomal plate, and coxal apodemes of all legs. Legs I and II usual labidocarpid type. Legs III and IV four-segmented. Leg III shorter and thicker than leg IV; with single main claw larger than accessory spurs, slightly curved throughout length, more acute at apex; 2 accessory spurs, shorter and thicker than main claw with inner surface furrowed; outer accessory spur thicker and longer than inner accessory spur, both broad at base, narrowed toward apical end like those of *A. jonesi* McDaniel, knife-shaped with furrowed cutting edge; without large seta at base of main claw between main claw and inner accessory spur; two large subequal setae on tarsus, 1 on ventral surface, 1 on dorsal surface, both near pseudo-articulation of tarsus and claws; dorsal setae curved, ventral setae straight (Fig. 1). Leg IV tarsus (Fig. 1), with single main claw, curved, much longer than main claw



of leg III, thicker than *A. jonesi* main claw, curvature more acute at apex than on *A. jonesi*; one accessory spur, much longer than accessory spurs of leg III, inner edge furrowed, margin parallel to distal portion, distal portion narrowed with rounded apex; accessory spur approximately same width and size as main claw of leg III; much broader and thicker than same accessory spur of *A. jonesi*; 1 large slender seta below pseudoarticulation of tarsus and claws; seta as long as main claw, origin same as that of accessory spurs; 1 large seta on dorsal surface of tarsus above and adjacent to pseudoarticulation, similar in shape to same seta on leg III; one small seta at anterior dorsal portion of tarsus; 2 pairs long, slender setae on apodemes of coxa IV. Gnathosoma short, adapted for clasping hair, palpi with recurved teeth (Fig. 1). Chelicera base extends to apodeme of leg I, expanded basally and terminates apically in two digits bearing teeth. Propodosomal plate extends to coxa II without lateral pointed projection as associated with male of *A. jonesi*. Three pairs minute setae posterior to propodosomal plate, lateral setae typical *Alabidocarpus* type, i.e., posterior pair long, extends to coxa IV; anterior pair minute, similar in structure to minute dorsal setae. Anal region with pair of anal suckers (Fig. 2), three pairs anal setae, center pair well-developed, extend beyond longitudinal slit, other 2 pair short (Fig. 1). Sclerotized plate of anal area covers opisthosomal region. Other body setae as shown in Fig. 1. Length 0.442 mm, width 0.256 mm (measured between legs II and III).

**FEMALE:** Body laterally compressed as in male, with numerous ( $55 \pm$ ) fine annulations; skin transparent as in male, without sclerotized opisthosomal plate. Legs I and II modified as in male. Legs III and IV with same type main claw and accessory spurs as male. Leg IV longer and thinner than leg III, similar to male except not as long (Fig. 2); tarsus with single main claw, larger than accessory spur, slightly curved throughout length; more acute at apex, with seta between claw and accessory spur, base below pseudoarticulation of tarsus and claws; accessory spur long and thin, longer than accessory spurs of leg III, inner edge furrowed, margin parallel to distal portion, distal portion narrows to rounded apex; accessory spur thinner than same spur on male; large seta on dorsal surface of tarsus similar to that found on male. Leg III similar to male leg III. Two pairs setae between coxal apodemes of leg III. Gnathosoma similar to male, longer, adapted for clasp-

ing hair, palpi with recurved teeth (Fig. 2). Chelicerae similar to male. Propodosomal plate similar to male without lateral pointed projections. Minute setae similar in structure and location as male; lateral setae same as male; pair of minute setae similar in structure to propodosomal setae, placed above coxa IV on dorsal portion of body. Opisthosomal region without sclerotized plate, bears two large anal setae each associated with pair of minute setae similar to propodosomal setae. Other body setae shown in Fig. 2. Length 0.419 mm, width 0.233 mm (measured between legs II and III). **Copulatory female—Early Stage.** Body oval without evidence of formation within puparium; annulations  $28 \pm$ , many not extending whole width of body. Hysterosoma without annulations except at ventral regions where annulations present but not extending to dorsal portion of body. Anal area of body with annulations ( $5 \pm$  in number) with single pair of setae. Hysterosomal region sclerotized without annulations.<sup>2</sup> Puparium without winglike projections. Four pairs spined papillae; first and second pair with 3 spines, unequal in length; third pair with 4 spines; fourth pair with 1 large spine with 2 setae. Length 0.326 mm, width 0.29 mm (measured between papillae II and III). The size of this species' puparium may vary greatly due to the stage of development. **Copulatory Female—Late Stage.** Body egg-shaped with fully-formed female within puparium; annulations  $38 \pm$ , many not extending whole width of body (Fig. 3). Hysterosomal region of puparium without annulations or winglike projections. Four pairs spined papillae; first and second pair with 3 unequal spines (Fig. 3); third pair with 4 pair unequal spines; fourth pair with 3 pair of spines, 2 large, 1 short and thick (Fig. 3). Females observed in Venezuelan material have the same tarsal claw and spur arrangement on leg III and the same minute setae, shape of propodosomal plate, recurved teeth on palpi, and setae as mature females. Length 0.442 mm, width 0.256 mm (measured between papillae II and III).

**HEXAPOD LARVA:** Body laterally compressed with numerous annulations ( $32 \pm$ ); skin transparent except for same areas sclerotized in female. Legs I and II modified for clasping hair as in adults. Leg III with same type claw, spurs, and tarsal setae as in female. Pair of well developed setae between 2nd and 3rd pair legs. Gnathosoma short; palpi with recurved teeth similar to female and male. Chelicerae similar to female, functional, expanded basally, terminate in 2 digits bearing teeth. Propodosomal plate

<sup>2</sup>This raises the question that this may be related to the male rather than the female due to the presence of a sclerotized opisthosomal plate found only on males of this species. However, stages are known to be attached to the mature males.



present, similar in shape and structure to female with same associated minute setae. Lateral setae same as female. Hysterosomal region without annulations with winglike structures for clasping male. Anus similar to female; 1 pair anal setae. Other body setae shown in Fig. 4. Length 0.372 mm, width 0.186 mm, measured between legs II and III).

#### DIAGNOSIS

*Albidocarpus nicaraguae* McDaniel is most closely related to *A. jonesi*, but differs from it in larger size; absence of pointed lateral projections of the propodosomal plate; the size of leg IV, which is more acute at the apex; and accessory spur of leg IV which is much broader and thicker.

**TYPE DATA:** Male holotype ex *Uroderma bilobatum molaris* (KU-110985), Santa Rosa, 17 km N, 16 km E Boaco, Nicaragua, 300 m elev., 9-VIII-67, collected by James D. Smith (JDS-3355).

#### VENEZUELAN RECORDS

Three females, 2 copulatory females, 3 males, 2 nymphs ex *Uroderma magnirostrum* (SVP 18463 and 18465), T. F. Amazonas, Tamatama, Río Orinoco, 135 m elev., 1-V-67; 1 female, 1 copulatory female, 2 males, host (SVP 18570), and data as above except 2-V-67.

#### REMARKS

This is the second record of this species. Its original distribution was from Nicaragua from *Uroderma bilobatum molaris*. This extends the range of *A. nicaraguae* to include South America. This species to date is restricted to the host species *U. bilobatum* and *U. magnirostrum*. McDaniel (1970) stated that the female allotype possibly was not fully mature. However, in a comparison of material collected from Venezuela, the allotype contains all those structures of specimens known to be fully mature.

*Albidocarpus jonesi* McDaniel

*Albidocarpus jonesi* McDaniel, 1970:804.

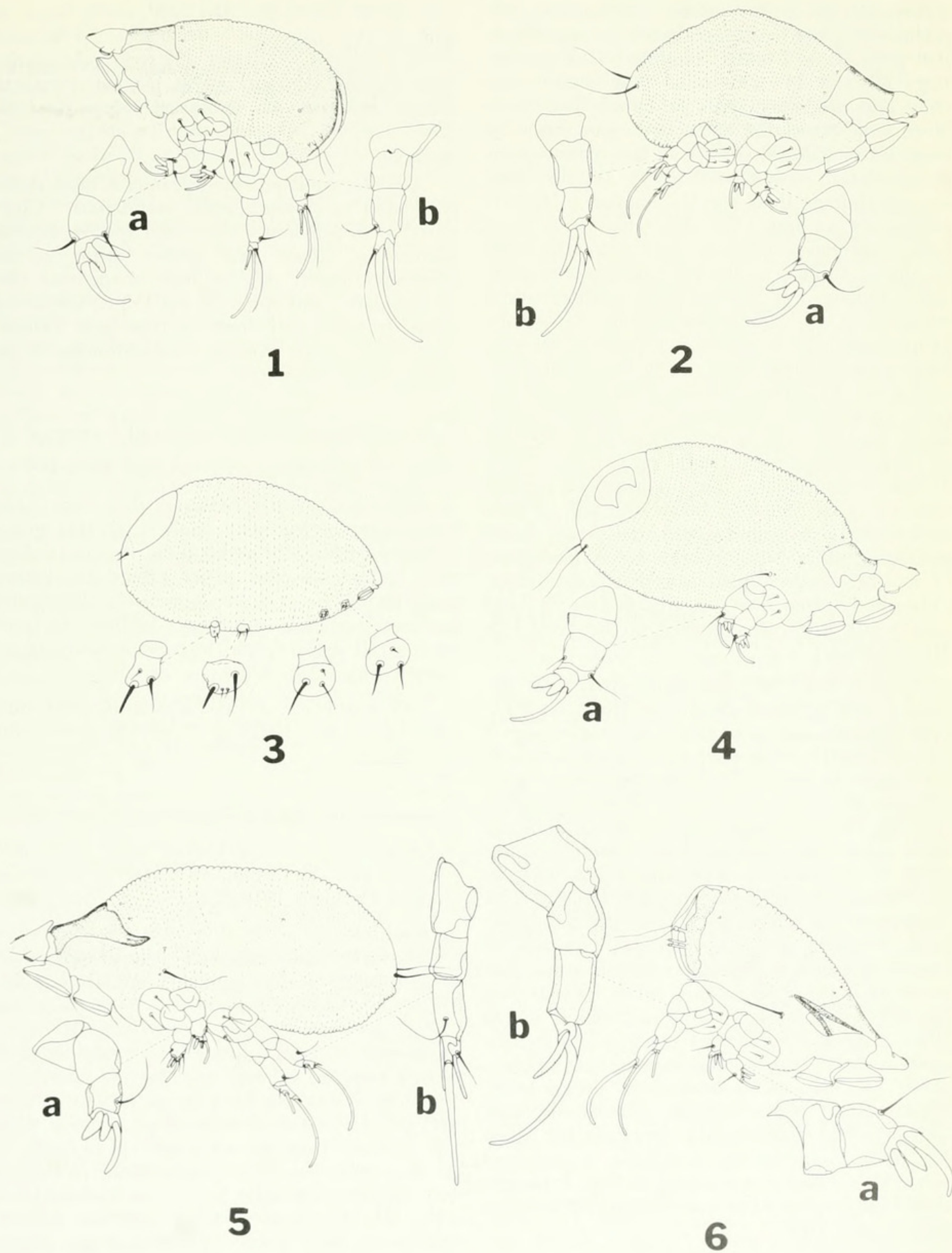
#### REDESCRIPTION

**FEMALE:** Body laterally compressed with numerous ( $40\pm$ ) fine annulations; transparent except for gnathosoma, anterior propodosomal plate, and coxal apodemes of all legs. Legs I and II highly modified, of usual labidocarpid type, i.e., plates flaplike, dilated distally, of equal size, adapted for fitting around hair of host. Legs III and IV four-segmented, leg III shorter and thicker than leg IV with single main claw larger than accessory spurs, slightly curved at distal end; 2 accessory spurs shorter and thicker than main claw, inner surface furrowed;

outer accessory spur thicker and longer than inner accessory spur, both broad at base, narrow toward apical end, and knife shaped with furrowed cutting edge; with large seta at base of main claw, between main claw and inner accessory spur; 2 large setae on tarsus, one ventral, one dorsal, both near pseudoarticulation of tarsus and claws; dorsal setae longer and larger than ventral ones. Leg IV much longer than leg III (Fig. 5), tarsus with single main claw curved, much longer and slimmer than main claw of leg III; 1 accessory spur much longer and thinner than either accessory spurs of leg III, with inner edge lightly furrowed, broad at base, tapers to blunt apex; length much shorter than main claws of leg IV, nearly as long as main claws of leg III (Fig. 5); 1 large seta on dorsal surface of tarsus near pseudoarticulation of tarsus and claws; 1 small seta at anterior dorsal portion of tarsus; 2 pairs long, slender setae on apodemes of coxae IV; base of main claw with small spinelike projection behind claw base extending dorsally beyond claw base (Fig. 5). Gnathosoma short, palpi with recurved teeth (Fig. 5). Chelicerae approximately as long as gnathosoma, slightly expanded basally, terminate apically in 2 digits bearing teeth. Propodosomal plate extends slightly beyond coxa of leg II, with pointed lateral projection extending to coxa of leg III (Fig. 5). Two pairs of minute setae posterior to propodosomal plate, another similar pair just below and posterior to lateral projections of propodosoma. Two pairs of lateral setae just above apodemes of leg III, posterior pair well-developed, extend beyond apodemes of leg IV; anterior pair similar to minute setae near propodosomal plate. Other setae as shown in Fig. 5. Anus a longitudinal slit, bounded by a pair of large anal setae and a pair of minute setae. Length of female 0.533 mm, width 0.233 mm (measured between legs II and III). **Copulatory Female.** Body egg shaped with fully formed female within puparium; in some specimens annulations  $32\pm$ , many not extending whole width of body (Fig. 7). Hysterosomal region of puparium without annulations or winglike projections. Four pairs of spined papillae; first and second pairs with 2 spines, unequal in length; third and fourth pairs with 4 and 3 respectively (Fig. 7). Mouth parts absent or rudimentary. Female within puparium resembles mature female, has same tarsal claw and spur arrangement on legs III and IV. Length 0.372 mm, width 0.209 mm (measured between second and third spined papillae).

**MALE:** Body laterally compressed as in female, numerous ( $27\pm$ ) fine annulations; skin





Figs. 1-6. (1) *Alabidocarpus nicaraguae* McDaniel, Male, a. leg III, b. leg IV. (2) *Alabidocarpus nicaraguae* McDaniel, Female, a. leg III, b. leg IV. (3) *Alabidocarpus nicaraguae* McDaniel, copulatory female. (4) *Alabidocarpus nicaraguae* McDaniel, Nymph, a. leg III. (5) *Alabidocarpus jonesi* McDaniel, Female, a. leg III, b. leg IV. (6) *Alabidocarpus jonesi* McDaniel, Male, a. leg III, b. leg IV.



transparent except for anterior gnathosoma, propodosomal plate, coxal apodemes and opisthosomal plate. Legs I and II modified as in female. Legs III and IV with same type main tarsal claw and accessory spurs as female and same large setae associated with claw and spurs. One large seta on dorsal surface of tarsus near pseudoarticulation of tarsi and claws. Leg IV longer and thinner than leg III, similar to female except not as long (Fig. 6); tarsus with same type main claw, accessory spur and large setae on dorsal surface as female. Gnathosoma similar to female only shorter; palpi with recurved teeth (Fig. 6). Chelicerae similar to female. Propodosomal plate similar to female except with longer lateral projections extending beyond lateral setae. Two pairs minute setae between lateral projections posterior to propodosomal plate, another pair minute setae at apical end of propodosomal plate lateral projections. Lateral setae as on female, dorsal pair extend beyond coxa IV. Anal region of body with pair of anal suckers (Fig. 6); three pairs anal setae, dorsal pair long, other 2 pairs short. Sclerotized plate of anal area covers opisthosomal region of male. Other body setae shown in Fig. 6. Length 0.395 mm, width 0.186 mm (measured between legs III and IV).

**LARVA:** Body laterally compressed with numerous ( $22 \pm$ ) annulations; skin transparent except for same area sclerotized in female. Legs I and II modified for clasping hair as in female and male. Leg III with same type claw, spurs and tarsal setae as female. Setae associated with leg III coxal apodemes absent. Gnathosoma short; palpi with recurved teeth similar to adult (Fig. 8). Chelicerae approximately as long as gnathosoma, functional, expanded basally as in mature forms, terminates in two digits bearing teeth. Propodosomal plate present, but without lateral projections. Two pairs minute setae posterior to plate as in mature forms; similar pair located between lateral setae and minute dorsal setae. Lateral setae similar to male and female, posterior pair long, extend beyond coxa III; anterior pair minute, same type as dorsal setae. Hysterosomal region without annulations, with pair of round glandularlike structures for clasping male. Anus similar to female, 1 pair anal setae. Other body setae shown in Fig. 8. Length 0.302 mm, width 0.140 mm (measured between legs II and III).

#### TYPE DATA

Female holotype ex *Vampyrops helleri* (KU-111027) km N, 2.5 km W, Villa Somoza, Chontales, Nicaragua, 5-VIII-67, collected by

J. Knox Jones, Jr. (JKJ-5240).

#### VENEZUELAN RECORDS

Two females ex *Vampyrops helleri* (SVP 26818), T. F. Amazonas, clearing directly in front of Catholic Mission, San Juan, Río Manapiare, 155 m elev., 17-VII-67.

#### REMARKS

*Alabidocarpus jonesi* McDaniel is most closely related to *Alabidocarpus nicaraguae*. Compared with previously described species of *Alabidocarpus*, these two species differ in the elongated fourth pair of legs, shape and size of the claws, and spurs on leg IV. *A. jonesi* has been recorded only from its type host *Vampyrops helleri*. This extends its distribution to include South America.

#### Genus *Parakosa* McDaniel and Lawrence

*Parakosa* McDaniel and Lawrence, 1962:463.

McDaniel (1970) believed that with additional host collections members of this genus would be found throughout the Americas. Records included in this paper extend the known range from Nicaragua to Venezuela. The genus is characterized by a spine in addition to spurs on legs III and IV, and by a wide range of intraspecific size variation.

**TYPE SPECIES:** *Parakosa tadarida* McDaniel and Lawrence, 1962, ex *Tadarida laticaudata yucatanica*.

#### *Parakosa tadarida* McDaniel and Lawrence

*Parakosa tadarida* McDaniel and Lawrence, 1962:146.—McDaniel, 1970:804. — McDaniel and Coffman 1970:233.

#### REDESCRIPTION

**FEMALE:** Body laterally compressed, oval-shaped with numerous fine annulations; skin transparent except for anterior head plate and coxal apodemes of legs. Legs I and II highly modified, of usual labidocarpid type, i.e., with plates flaplike, dilated distally, of equal size. Front legs used to clasp hairs of host. Legs III and IV anterior to midline of body. Leg IV removed from posterior portion of body by at least three times its length. Head plate with two lateral projections beset with minute pores (Fig. 9). Apodeme of leg I obscures anterior portion of head plate. Gnathosoma not clearly delineated, not produced into sharp point as on *Alabidocarpus* and *Labidocarpus*, rather short and blunt with rounded lobes on upper surface.<sup>3</sup> Two stout setae on each side posterior

<sup>3</sup>Due to complexity and small size of gnathosoma, details of this structure have been difficult to ascertain



to head plate, upper subequal to lower, near base of leg I apodeme. Subequal pair of long setae above coxa III, insertions similar to those posterior to head plate. Legs III and IV with four segments, apodemes connected (Fig. 9). Coxae expanded into elongate pyramid, connected to fused apodemes. Leg III stouter than leg IV, with 3 tarsal spines; single main claw long and curved, with two shorter, straight accessory spurs; large triangular-shaped spine at base of main claw, removed from accessory spurs. Leg IV longer, coxa smaller, segments more elongate than leg III; single main claw curved, length exceeding main claw of leg III, curved portion more concentrated at apex; single accessory spur and base of main claw separated by triangular spine similar to leg III. A pair of small hairlike setae between coxae III and IV. Approximately 50 annulations interrupted at posterior section, not plainly visible at anterior end. Dorsal surface annulations appear as distinct ripples (Fig. 9). Anus a longitudinal slit bounded by 2 pairs of large, thick anal setae of equal size and length, similar to those of anterior part of body. Length of female 0.992 mm. *Copulatory Female*. Body egg shaped as in mature female, without well-developed legs and gnathosoma (Fig. 10b). Two pairs large thick setae posterior to mature female's head plate, well developed in copulatory female. Two pairs setae near coxa III well developed. Gnathosoma and legs I and II indicated by sclerotization. Legs III and IV indicated by small humps and presence of large setae where coxae III will be formed. Body with series of annulations extending from anterior to posterior of body, interrupted at anal section to form a V.

**MALE:** Body laterally compressed as in female, oval shaped, much more reduced than female; legs III and IV posterior to midline; leg IV extends beyond posterior end; numerous annulations; skin transparent as in female except ventral margin which contains legs and associated apodemes. Legs I and II highly modified as in female. Head plate, type and number of setae located posterior to head plate similar to female. Pair of long setae near coxa III similar to female in structure. Legs with four segments, not clearly delineated. Apodemes of leg III fuse with those of leg II, with keel-like protrusion located between legs II and III (Fig. 10a). Leg III with single main claw, 2 accessory spurs, single triangular spine. Last 2 segments of leg III narrow, wide proximal segments stout; those in leg IV more or less equal throughout. Leg IV with single main claw, 1 accessory spur, single triangular spine; main

claw longer than main claw of leg III. Series of fine annulations extends from head plate to insertion of coxa IV. Remainder of abdomen free of annulations. Posterior section with longitudinal slit, each side contains pair of anal setae of same size and structure. Sclerotized male reproductive organs within slit; extend when in contact with copulatory female.

**LARVA:** Body egg shaped, with annulations; gnathosoma developed; 3 pairs of legs. Legs I and II well developed, same specialized structures as adult; leg III contains four not clearly delineated segments; well-developed main claw, curved as on adult; 2 straight, subequal accessory spurs. Triangular spine characteristic of species seen as small spine between main claw and accessory spur. Coxal apodemes united, form U between legs. Well-developed setae on body anterior, 2 long anal setae at body posterior. Description made from larva contained within female body (Fig. 9).

**TYPE DATA:** Holotype ex *Tadarida laticaudata yucatanica*, 4.8 km N Antigua Morelos, Tamaulipas, Mexico.

#### VENEZUELAN RECORDS

One female (hexapod larva within body) ex *Sturnira lilium* (SVP 120), Dto. Federal, 4 km N Caracas, 1465 m elev., 23-VII-65; 1 copulatory female ex *Glossophaga longirostris* (SVP 5812), Apure, 46 km NE Puerto Paez. Hato Cariben, Río Cinaruco, 76 m elev., 23-XII-65; 1 copulatory female, 2 males, host (SVP 6260) as above, Apure, 38 km NW Puerto Paez, Río Cinaruco, 19-I-66; 1 female, 1 male ex *Molossus bondae* (SVP 7112), Yaracuy-Carabobo border, Río Yaracuy, 10 km NW Urama, 25 m elev., 17-III-66; 1 female, 1 copulatory female, 1 male, host (SVP 7151) as above except 17-III-66; 1 copulatory female, 1 male ex *Molossus ater* (SVP 13407), Sucre, 7 km N, 5 km E Güiría (Ensenada Cauranta), 10-VI-67; 4 females, hosts (SVP 13717, 13723, and 13738) as above, Monagas, 3 km N, 4 km W Caripe, San Agustín, 1160 m elev., 26-VI-67; 3 females, 1 copulatory female, 2 males; 1 hexapod nymph, hosts (SVP 13755 and 13756) and data as above except 1180 m elev., 27-VI-67; 3 females, 3 males, 3 nymphs, hosts (SVP 13770 and 13776) and data same as SVP 13717 except 28-VI-67; 2 females (1 with hexapod larva within body), 2 copulatory females, 2 males, 1 nymph, host (SVP 13773) and data same as SVP 13717 except 1165 m elev., 28-VI-67; 1 female, 1 copulatory female, 1 male, host (SVP 13791) and data same as SVP 13717 except 29-VI-67; 2 females, 1 copulatory female, 1 male, hosts (SVP 13979 and 13981), and data same as SVP 13717 except 6-VII-67; 1 female, 1 copulatory female, 3 males, 5 nymphs, host (SVP 14009), and data as above except 7-VI-67; 5 females (1 with hexapod larva within body), 4 copulatory females, 3 males, 1 nymph ex *Molossus ater* (SVP 28776, 28777, and 28798), T. F. Amazonas, 4 km NE San Juan, Río Manapiare, 155 m elev., 24-VII-67; 1 female (hexapod larva within body), 1 copulatory female, 2 males ex *Noctilio labialis* (SVP 28744), T. F. Amazonas, 4 km NE San Juan, Río Manapiare, 24-VI-67; 1 female ex *Carollia brevicauda* (SVP 13736), Monagas,



3 km N, 4 km W Caripe, San Agustin, 1160 m elev., 25-VI-67; 1 male, host (SVP 31979) as above, Carabobo, 9 km NE Montalbán, Cumbre Canoabo, 1-XI-67.

#### REMARKS

*Parakosa tadarida* commonly parasitizes numerous species of bats from the southern United States to Venezuela. It was first recorded from a free-tailed bat in Mexico and has since been recorded from the United States, Nicaragua and now in Venezuela from members of the families Molossidae (Mexico, United States, Nicaragua and Venezuela), Noctilionidae (Venezuela), and Phyllostomidae (Venezuela). It was found to be a major parasite on some species of bats in Venezuela.

*Parakosa maxima* McDaniel

*Parakosa maxima* McDaniel, 1970:804.

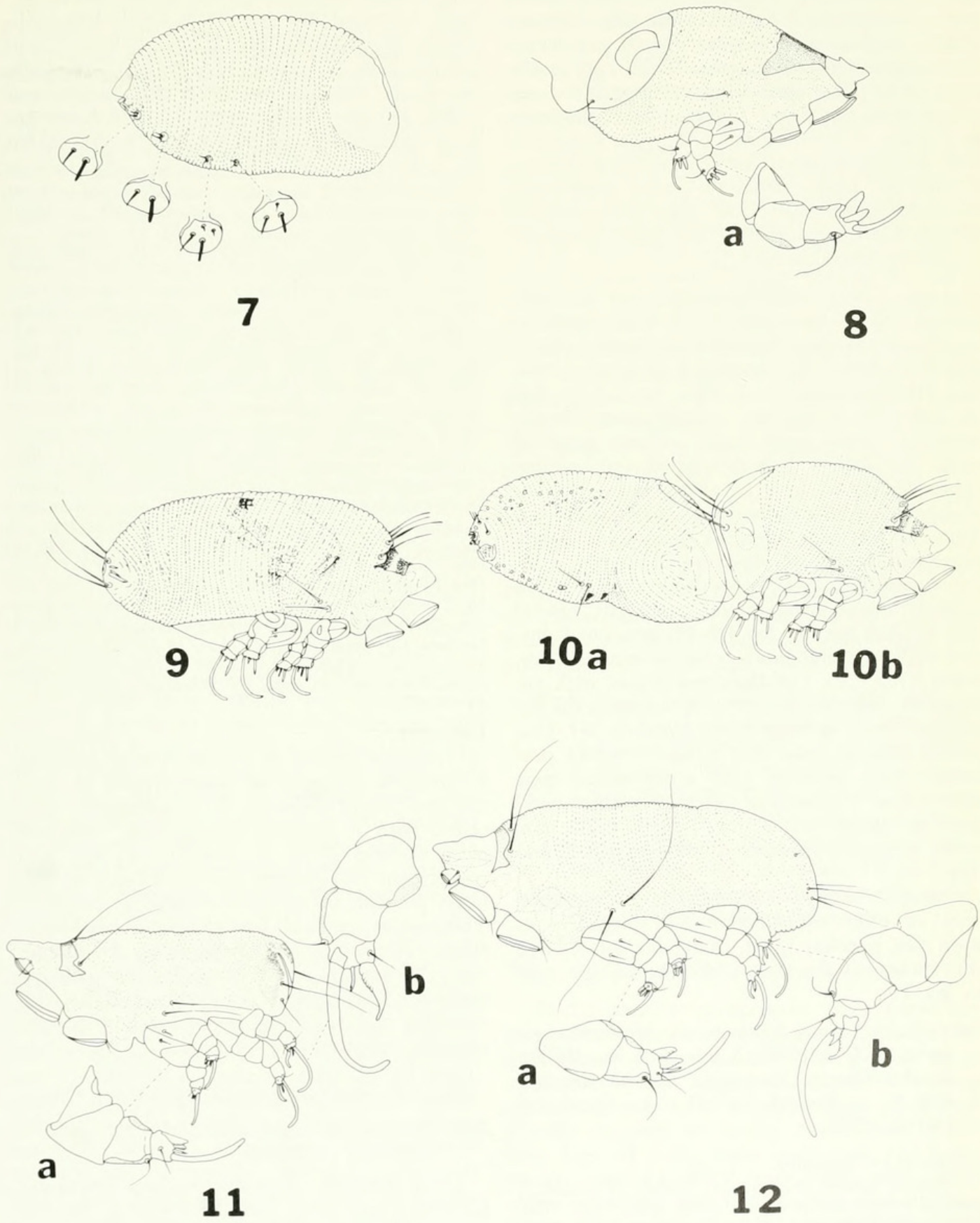
#### REDESCRIPTION

**MALE:** Body laterally compressed with numerous ( $51 \pm$ ) fine annulations; skin transparent except for gnathosoma, anterior propodosomal plate, coxal apodemes and opisthosomal region. Legs I and II highly modified, usual labidocarpid type with plates flaplike, dilated distally, and adapted for fitting around hair of host. Legs III and IV with four segments; those of leg III more compact than leg IV. Leg III shorter than leg IV with main single claw larger than accessory spurs, slightly curved throughout with acute curvature at apex; two accessory spurs, shorter and thicker than main claw, with inner surfaces furrowed, knifelike with sawtoothed apex; inner spur broader and longer than outer spur (Fig. 11); "triangular spine" between main claw and inner accessory spur much longer than as found in other species of this genus and is curved at base; 2 pairs setae associated with claw, spurs, and spine; bases near tarsus pseudoarticulation; 2 pairs setae on tarsus above pseudoarticulation; 1 pair on ventral surface; other on dorsal surface. Keeled region between legs II and III with 1 pair of setae. Leg IV with single main claw much longer than main claw of leg III, curved, more acute at apex; single accessory spur broadest at base with knife-edge furrow extending only to acute curvature of spur; accessory spur apex bent at angle greater than distal end of main claw, terminating in rounded point, this region without furrows; "triangular spine" similar as on leg III with curved base but forked at end (Fig. 11); 2 pairs setae placed below pseudoarticulation of tarsus, associated with claw, spur, and spine; 1 pair dorsal setae on tarsus adjacent to and above pseudoarticulation.

Gnathosoma long; palpi broad, cover dorsal region, without recurved teeth. Chelicerae large, occupy whole gnathosomal region, terminate in two digits bearing teeth. Propodosomal plate small, blends with leg I apodemes. Two pairs propodosomal setae associated with propodosomal plate margin; large, length extends beyond body, longer than gnathosomal region. Two pairs lateral setae between legs II and III in proximity of coxa III, their length extends to sclerotized opisthosomal region of body. Anal region with pair of large anal suckers (Fig. 11), 3 pairs anal setae, 2 dorsal pairs longer than leg IV main claw. Anal area with sclerotized plate in dorsal region, not extending to venter (Fig. 11). Pair of minute setae placed in middle of opisthosomal region near sclerotized plate. Other body setae shown in Fig. 11. Length 0.767 mm, width 0.302 mm (measured between legs II and III).

**FEMALE:** Body laterally compressed with numerous ( $78 \pm$ ) fine annulations; skin transparent except for gnathosoma, propodosomal plate and coxal apodemes of all legs. Legs I and II modified as on male. Legs III and IV with main tarsal claw and accessory spurs as on male, with same setal association. Keeled region between leg IV apodemes with 1 pair of setae. Gnathosoma similar to male only larger; palpi similar to male, without recurved teeth. Chelicerae similar to male only larger; with 2 digits, one bears a single tooth. Propodosomal plate similar to male only larger with propodosomal setae in rounded indentation of plate (Fig. 12). Two pairs propodosomal setae, longer than total gnathosomal length. Lateral setae similar to male only larger, length extending to coxa IV. Anal region without sclerotization, with 3 pairs of minute setae, 2 pairs large anal setae; annulation absent on extreme apex of body (Fig. 12). Other body setae shown in Fig. 12. Length 1.079 mm, width 0.419 mm (measured between legs II and III). *Copulatory Female.* Body elongated with fully formed female within puparium in some, absent in others; body annulations ( $59 \pm$ ) narrow on some parts of body, wide in other regions. Chelicerae well developed, 2 digits with structure similar to female and male. Propodosomal plate indicated, associated with 2 pairs of setae similar in structure as adult. Two pairs of lateral setae well developed; dorsal pair large, similar in length and size to lateral setae on adult; ventral pair small, length not exceeding width of 2 annulations on that body region (Fig. 13). Anal region with wing-like process to clasp male. Four pairs of spined papillae, first pair two-segmented with 2 apical





Figs. 7-12. (7)*Alabidocarpus jonesi* McDaniel, Copulatory female. (8) *Alabidocarpus jonesi* McDaniel, Nymph, a. leg III. (9)*Parakosa tadarida* McDaniel and Lawrence, Female with Nymph shown within body. (10) *Parakosa tadarida* McDaniel and Lawrence, a. Copulatory female, b. male. (11) *Parakosa maxima* McDaniel, Male, a. leg III, b. leg IV. (12) *Parakosa maxima* McDaniel, Female, a. leg III, b. leg IV.



spines; second pair single without spines; third pair two-segmented leglike, with first segment similar to coxa, with 1 spine; fourth pair large, three-segmented with 1 spine. Third and fourth pairs of papillae form separate groups far removed from papillae I and II, placed posterior to 2 pairs of lateral setae (Fig. 13). Puparium with fully developed female resembling mature female in body structure, setae placement, structure, tarsal claw, and spur arrangement. Length 0.884 mm, width 0.372 mm (measured at site of lateral setae).

**LARVA:** Body laterally compressed with numerous ( $35\pm$ ) annulations; skin transparent except for same area sclerotized in female. Legs I and II modified for clasping hair as on adults. Leg III with same type claw, spurs, and tarsal setae as on female. Gnathosomal length similar to male, palpi broad without recurved teeth. Chelicerae well developed for feeding, approximately as long as gnathosoma, expanded basally as in mature forms, terminates in 2 digits which bear teeth. Propodosomal plate developed similar to structure in female, associated with 2 pairs of propodosomal setae. Two pairs of lateral setae equal in length, extend well beyond coxa of leg III. Hysterosomal dorsum without annulations, contains winglike processes (Fig. 14). Opisthosomal region with annulations (the count of  $35\pm$  annulations for the hexapod larva includes these annulations). One pair of minute setae just below winglike processes. Two pairs of anal setae, dorsal pair shorter than ventral pair (Fig. 14). Other body setae as shown in Fig. 14. Length 0.535 mm, width 0.209 mm (measured between legs II and III).

*Parakosa maxima* McDaniel is distinguished from all other members of the genus by its large size, peculiar spurs, triangular spine, large anal suckers of the male and curved single spur on leg IV.

**TYPE DATA:** Male holotype ex *Molossus pretiosus* (KU 111245) 3 km N, 4 km W Diamamba, Carazo, Nicaragua, 500 m elev., 16-VIII-67, collected by H. H. Genoways (HHG-1374).

#### VENEZUELAN RECORDS

Fifteen females, 5 copulatory females, 11 males, 2 nymphs ex *Molossus ater* (SVP 5730, 5732, 5733, 5736, 5737, 5739, 5740, 5741, 5742, 5743, 5745, 5746, 5748, and 5752) Apure, 46 km NE Puerto Paez, Hato, Cariben, Río Cinaruco, 76 m elev., 17-XII-65; 1 female, host (SVP 13407) as above, Sucre, 7 km N, 5 km E Güiria (Ensenada Cauranta), 1160 m elev., 10-VI-67; 1 copulatory female, 2 males, hosts (SVP 13727 and 13738) as above, Monagas, 3 km N, 4 km W Caripe. San Agustín, 26-VI-67; 1 female, 1 copulatory female, 2

males, host (SVP 13755), and data as above except, 27-VI-67; 1 female, 1 copulatory female, 1 male, host (SVP 13770), and data as above except 28-VI-67; 5 females, 1 nymph, hosts (SVP 13974, 13975, 13976, and 13977), and data as above except 6-VII-67; 3 females, 1 copulatory female, 2 males, hosts (SVP 13995, 14003, and 14008), and data as above except 7-VII-67; 8 females, 6 copulatory females, 5 males, 3 nymphs, hosts (SVP 28771, 28773, 28777, 28796, and 28798) as above, T. F. Amazonas, 4 km NE San Juan, Río Manapiare, 155 m elev., 24-VII-67; 2 copulatory females, 2 males, host (SVP 31516) as above, T. F. Amazonas, 65 km SSW Puerto Ayacucho, Morocoy, 8-X-67; 6 females, 2 nymphs ex *Molossus bondae* (SVP 7105, 7108, and 7116), Yaracuy-Carabobo, Río Yaracuy, 10 km NW Urama, 25 m elev., 17-III-66; 1 female, 1 nymph, host (SVP 7151) as above; 3 females, 1 copulatory female, 1 male, 1 nymph ex *Molossus major* (SVP 7106 and 7119), Yaracuy-Carabobo border, Río Yaracuy, 10 km NW Urama, 25 m elev., 17-III-66; 1 female, 1 male ex *Molossus major* (SVP 9047) Bolívar, 59 km SE El Dorado, Km 74, El Manaco, 150 m elev., 8-VI-66; 1 female, 1 copulatory female, 1 male ex *Molossus major* (SVP 9457 and 9459), data as above except 17-VI-66; 2 females, 1 copulatory female, 1 male ex *Molossus ater* (SVP 9049), data as above except 9-VI-66; 2 females, host (SVP 9861), and data as above except 20-VI-66; 1 female, 1 male, 1 nymph, host (SVP 15580) as above, T. F. Amazonas, Río Cunucunuma, Belén, 150 m elev., 6-I-67; 1 female ex *Artibeus harti* (SVP 1116), Dto. Federal, 5 km NNE Caracas, 2092 m elev., 10-IX-65; 1 copulatory female, 1 male ex *Glossophaga longirostris* (SVP 5665), Apure, 46 km NE Puerto Paez, Hato Cariben, Río Cinaruco, 76 m elev., 14-XII-66; 1 female, 1 nymph ex *Noctilio labialis* (SVP 28744), T. F. Amazonas, 4 km NE San Juan, Río Manapiare, 155 m elev., 24-VII-67.

#### REMARKS

*Parakosa maxima* is a large species and, like *P. tadarida*, is found on many species in Central and South America. It is commonly associated with *P. tadarida* on the same host species. Knowledge of its position on the host might help to establish the relationship of this large parasite to its close relative *P. tadarida*. This species occurs on bats of the families Molossidae (Nicaragua and Venezuela), Noctilionidae (Nicaragua and Venezuela) and Phyllostomidae (Venezuela). In numbers of individuals this was the most numerous labidocarpid parasite collected in Venezuela.

Genus *Lawrenceocarpus* Dusbábek and Cruz  
*Lawrenceocarpus* Dusbábek and Cruz, 1966:3.  
—McDaniel 1970:819.

**TYPE SPECIES:** *Lawrenceocarpus micropilus* Dusbábek and Cruz, 1966, ex *Chilonycteris fuliginosa torrei*.

*Lawrenceocarpus phyllostomus*, new species

#### DESCRIPTION

**FEMALE:** Body laterally compressed with numerous ( $52\pm$ ) fine annulations; exoskeleton



transparent except for gnathosoma, anterior propodosomal plate and coxal apodemes of legs. Legs I and II usual labidocarpid type with plates flaplike, dilated distally, adapted for fitting around hair of host (Fig. 15). Legs III and IV with normal leg segments; leg III shorter and thicker than leg IV, single accessory spur with broadly rounded, serrated apex typical of genus (Figs. 15, 15a); 2 setae associated with tarsus and region bearing claw and accessory spur; 1 pair of setae associated with coxal apodemes. Leg IV much longer than leg III; tarsus with single main long claw, curved, associated with single accessory spur, much longer but narrower than accessory spur of leg III (Fig. 15a). Accessory spur similar in length to same spur on *L. lobus* McDaniel, but shaped differently at apex; shorter than same spur on *L. micropilus* Dusbábek and Cruz. Single seta placed below pseudoarticulation of tarsus associated with main claw; single seta above pseudoarticulation of main claw. Setae smaller and shorter on leg III than on leg IV (Fig. 15a). Gnathosoma long, chelicerae with well-developed denticles. Propodosomal plate well developed, extends to posterior margin of coxa II (Fig. 15). Two large setae associated with plate similar in shape and size to those on tarsus IV. Other body setae small, not extending beyond body margin; most anterior pair placed near coxa III; 2 pairs of setae located between legs III and IV; 2 pairs located posterior to leg IV; all of similar shape and size. Two pairs anal setae of similar length as propodosomal plate setae. Anus curved, longitudinal slit bounded by anal setae. Length of female 0.623 mm, width 0.219 mm (measured between legs III and IV). *Copulatory Female*. Not available for study.

**MALE:** Body laterally compressed as in female with numerous ( $37\pm$ ) annulations; skin transparent except for anterior gnathosoma, propodosomal plate, coxal apodemes and opisthosomal plate. Legs I and II modified as in female. Legs III and IV of unequal size, leg III much smaller than leg IV. Main claw of leg III modified as spurlike structure similar to accessory spur (Figs. 16, 16a). Main claw of leg IV similar to main claw of female with single accessory spur (Fig. 16a). Gnathosoma similar to female, not exposed. Chelicerae same as female, bears teeth on digits. Propodosomal plate similar to female, apex more rounded. Two large propodosomal setae similar to female. Pair of lateral setae located near and anterior to coxa III, shorter than propodosomal setae; another pair between leg III coxal apodemes (Fig. 16).

Similar pair of setae placed between modified legs I and II. Opisthosomal region with sclerotized plate; 1 pair of anal suckers and 4 anal setae (Fig. 16). Size and shape of anal setae shown in Fig. 16. Length 0.520 mm, width 0.232 mm (measured between legs III and IV).

**LARVA:** Body laterally compressed with numerous ( $27\pm$ ) annulations; skin transparent except for same sclerotized area as female. Legs I and II modified for clasping hair as on adult. Leg III with same type claw, spur, and setae as female. Gnathosomal length similar to male, chelicerae well developed for feeding, approximately as long as gnathosoma, terminating in two digits which bear teeth. Propodosomal plate well developed, similar shape as adult male, associated with pair of propodosomal setae (Fig. 17). Single pair of lateral setae, shorter than propodosomal setae, located near coxa III. Similar pair of setae located on leg III coxal apodemes. Other body setae smaller in size than lateral and apodeme setae; 4 pairs placed as shown in Fig. 17. Hysterosomal region without annulations, contains winglike processes (Fig. 17). Opisthosomal region with indications of small annulations associated with 2 large anal setae. Length 0.381 mm, width 0.158 mm (measured between legs II and III).

**TYPE DATA:** Male holotype, female allotype, and 4 female paratypes, ex *Phyllostomus elongatus* (SVP 18887), T. F. Amazonas, Tamatama, Río Orinoco, Venezuela, 5-VIII-67, M.D. Tuttle and F.L. Harder collectors. One female paratype ex *Microonycteris hirsuta* (SVP 18109), Río Mavaca, 108 km SSE Esmeralda, 140 m. elev., 14-IV-67. Holotype, allotype, and 1 paratype in U.S. National Museum.

#### *Pseudoalabidocarpus*, new genus

Body laterally compressed with numerous fine annulations; skin unsclerotized except for gnathosoma, propodosomal plates, and coxal apodemes of legs. Legs I and II modified as in all Labidocarpidae with plates flaplike, dilated distally, adapted for fitting around hair of bat host. Leg III with single main claw and 2 accessory spurs. Leg IV with single main claw and 1 accessory spur. Main claw of both legs longer than tarsus, rounded at top. Propodosomal setae long, extend beyond body. Opisthosomal region with 2 pairs of anal setae on female, longer than propodosomal setae (Fig. 16). Genus characterized by leg III having 2 accessory spurs, leg IV with single accessory spur and the main claw longer than tarsus and



rounded at tip. Propodosomal setae longer than propodosomal shield; 2 pairs of anal setae on female.

TYPE SPECIES: *Pseudoalabidocarpus secus*, new species, ex *Phyllistomas elongatus*.

*Pseudoalabidocarpus secus*, new species

DESCRIPTION

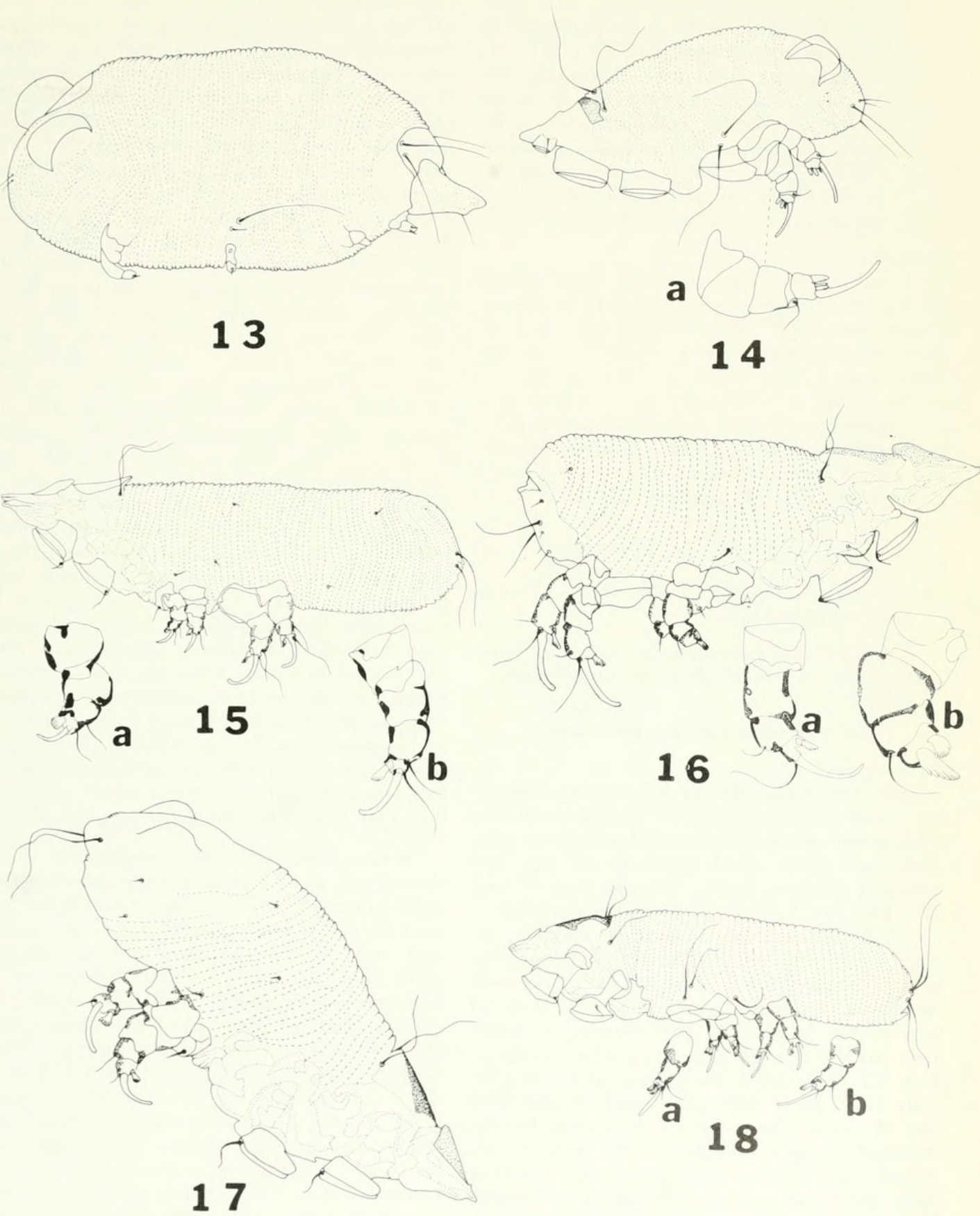
FEMALE: Body laterally compressed with numerous ( $51 \pm$ ) fine annulations; body unsclerotized except for gnathosoma, anterior propodosomal plates, and coxal apodemes. Legs I and II modified, of usual labidocarpid type with plates flaplike, dilated distally, adapted for fitting around hair of host. Legs III and IV similar in shape; leg IV longer and narrower than leg III. Leg III with main single claw longer than tarsus, not curved, rounded at tip shorter than leg IV main claw, longer than accessory spurs; 2 accessory spurs, subequal in size, both have furrowed inner surface, flat and somewhat spoon shaped (Fig. 18). Keel-like chitinous bar anterior to leg III, forms V-shaped structure for clasping host's hair. Prominent setae located on posterior side at distal portion of tibiae. Large seta, shorter than setae on tibia, located at base of main claw. Leg IV longer than leg III with single main claw curved, much longer than leg III main claw; 1 accessory spur, larger and thicker than either leg III accessory spurs with furrows, shape of spur broad at apex, tapers to rounded base; prominent large seta on posterior side at distal portion of tibia similar to same seta on leg III; small seta located at base of main claw. Chelicerae small, occupy whole gnathosomal region, extend to leg I apodemes, expanded basally, terminate apically in 2 digits bearing teeth (Fig. 18). Propodosomal plate elongate with pair of large setae; another pair of large setae similar in size and shape located between legs I and II. Two pairs of lateral setae placed just above apodemes of legs III, subequal in size, ventral pair longer than dorsal pair. Another large pair of lateral setae placed between legs III and IV; similar in size and shape to ventral lateral setae located near apodemes of leg III. Other setae arranged as shown in Fig. 18. Anus longitudinally slit with dorsal and ventral protruding lobes, 2 pairs of large anal setae, length exceeds opisthosomal region. Length of female holotype 0.400 mm, width 0.139 mm (measured between legs II and III). *Copulatory Female*. Body elongated, attached to male without evidence of female within puparium; similar to holotype female, annulations  $44 \pm$ . Gnathosomal

region well developed, pointed, shows indication of chelicerae (Fig. 20). Legs not developed; propodosomal setae well developed, similar to female. Single seta located near gnathosoma, smaller than propodosomal setae. Pair of ventral lateral setae located on body midregion. No evidence of papillae. Anal region with winglike process for attachment to male. Length 0.232 mm, width 0.139 mm (measured at site of single lateral seta).

MALE: Body laterally compressed with numerous ( $27 \pm$ ) fine annulations; body unsclerotized except for gnathosoma, propodosomal plates, coxal apodemes and opisthosomal plate. Legs I and II modified as on female. Legs III and IV with same number of accessory spurs (Fig. 19). Propodosomal setae well developed, similar in structure as female (Fig. 19). Another pair of setae located between propodosomal setae and apodemes of legs II; similar in size, shape, and structure to propodosomal setae. Another pair of large setae between enlarged clasping plates separating legs II and III. Two pairs of lateral setae, smaller than propodosomal setae, located just above legs III and IV apodemes. Anal region with pair of anal suckers. Two pairs of anal setae; dorsal pair longer and larger than ventral pair; both pairs longer than opisthosomal region of body; similar in structure to propodosomal setae. Opisthosomal region bears sclerotized plate (Fig. 19). Other body setae shown in Fig. 19. Length 0.297 mm, width 0.121 mm (measured between legs II and III).

LARVA: Body laterally compressed as in adult with numerous ( $27 \pm$ ) fine annulations. Sclerotized area same as male and female. Legs I and II modified for clasping hair as in adults. Leg III with same type claw and tarsal setae as leg IV of female. Gnathosomal length similar to male; chelicerae well developed for feeding, approximately as long as gnathosoma, digits terminate with well-developed teeth. Propodosomal plate developed similar to female, associated with pair of propodosomal setae similar to female, located on plate as on female (Fig. 21). Pair of setae in same position as on female, similar in structure to propodosomal plate setae. Two large setae located on sclerotized leg III apodeme region. Hysterosomal dorsum without annulations, contains winglike processes for clasping male. Opisthosomal region with 3 annulations (Fig. 21). Pair of anal setae located on annulated region below annulated opisthosomal region. Other setae shown in Fig. 21. Length 0.251 mm, width 0.93 mm (measured between legs II and III).





Figs. 13-18. (13) *Parakosa maxima* McDaniel, Copulatory female. (14) *Parakosa maxima* McDaniel, Nymph, a. leg III. (15) *Lawrenceocarpus phyllostomus*, new species, female, Allotype, a. leg III, b. leg IV. (16) *Lawrenceocarpus phyllostomus*, new species, Male, Holotype, a. leg III, b. leg IV. (17) *Lawrenceocarpus phyllostomus*, new species, Nymph. (18) *Pseudolabidocarpus secus*, new species. Female, Allotype, a. leg III, b. leg IV.



TYPE DATA: Female holotype, male allotype, 11 female and 5 male paratypes ex *Phyllostomus elongatus* (SVP 17517), T. F. Amazonas, 108 km SE Esmeralda, Río Mavaca, Venezuela, 5-IV-67, M. D. Tuttle and F. L. Harder, collectors. Also 4 female paratypes *Phyllostomus discolor* (SVP 18116), data as above except 14-IV-67. Other material studied includes 2 copulatory females and 2 hexapod larvae.

#### REMARKS

*Pseudoalabidocarpus secus* is distinguished by leg III having a single main claw and 2 accessory spurs and leg IV having a single main claw and accessory spur. The genus *Pseudoalabidocarpus* is most closely related to members of the genus *Alabidocarpus*, but differs in having propodosomal setae well developed and extending beyond body region. *Pseudoalabidocarpus* differs from the genus *Parakosa* by absence of the triangular spine on legs III and IV.

#### Genus *Labidocarpus* Trouessart

*Labidocarpus* Trouessart, 1895:39. — Pinichpongse 1963a:81.

TYPE SPECIES: *Labidocarpus rollinattia* Trouessart, 1895, ex *Phinolophus ferrum-equinum*.

#### *Labidocarpus dossuarius*, new species

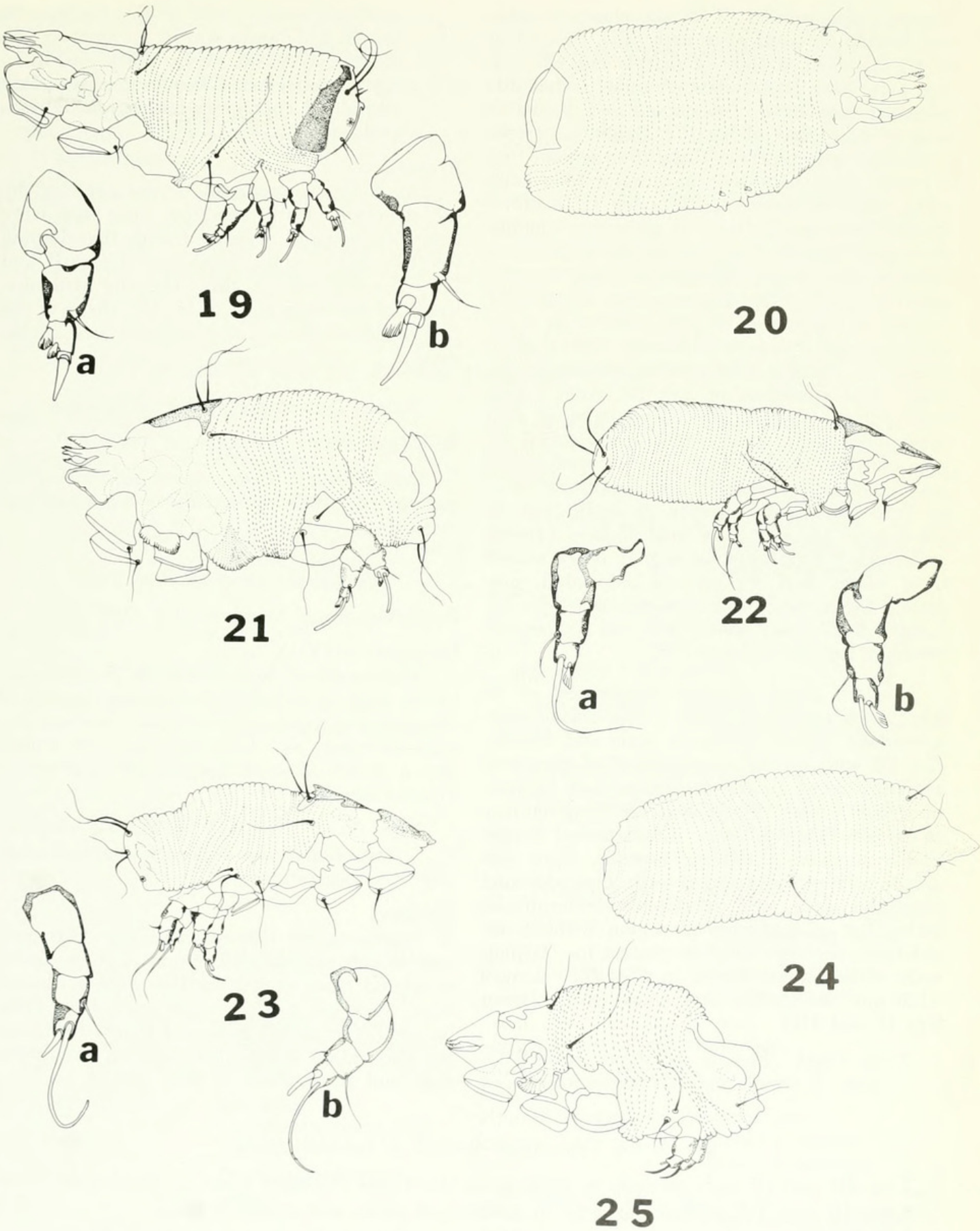
#### DESCRIPTION

FEMALE: Body laterally compressed, elongated, with numerous ( $52\pm$ ) fine annulations; transparent except for anterior head plates, propodosomal plate, coxal apodemes of legs and enlarged clasping region between legs II and III (Fig. 22). Legs I and II highly modified as in all *Labidocarpidae* with plates flaplike, dilated distally and adapted for fitting around hair of bat host. Flaplike clasping structures well developed between second and third pair of legs to aid in clasping and clinging to host's fine hairs. Legs III and IV similar in shape. Leg III with single main claw and accessory spur (Fig. 22a); main claw much shorter than leg IV main claw, curved, somewhat bluntly rounded at apex; accessory spur curved, furrowed inner surface; single seta located at tibia apex, short and stout in structure. Leg IV with long main claw of usual *labidocarpid* type with distal portion hairlike and projecting at an angle (Fig. 22a); single accessory spur, shorter and thicker than leg III accessory spur, apex furrowed, inner surface flat and somewhat spoon shaped. Keel-like chitinous structure associated with apodeme of leg III well developed. Apex

flaps of legs I and II with single seta; setae on leg I larger than on leg II. Gnathosoma elongated, produced into pointed apex. Chelicerae small, expanded basally, terminate apically in two digits bearing teeth. Propodosomal plate elongate, narrowed anteriorly. Propodosomal setae not located on sclerotized plate. Two pairs lateral setae similar to propodosomal setae, extend beyond body region as do propodosomal setae. Lateral setae located near apodemes of legs III and IV, subequal in size. Other body setae shown in Fig. 22. Anus longitudinal slit. Two pairs anal setae similar in shape to lateral and propodosomal setae. Length of female holotype 0.269 mm, width 0.84 mm (measured between legs III and IV). *Copulatory Female*. Body elongate, some forms attached to male with fully formed female within puparium, absent in others; annulations total  $35\pm$ , narrow in some regions, wide in others (Fig. 24). Leg III with same type claw and accessory spur as female. Gnathosomal length short; chelicerae well developed, digits terminate with well-developed teeth. Propodosomal plate well developed, similar to female, associated with two large propodosomal setae (Fig. 24). Large seta located near leg II apodeme, larger and longer than propodosomal setae. Lateral setae present, similar to lateral setae on adults. Hysterosomal dorsum without annulations, contains winglike processes for clasping male. Opisthosomal region with  $2\pm$  annulations. Single pair of anal setae located on unannulated region below winglike claspers. Length 0.213 mm, width 0.74 mm (measured between legs II and III).

MALE: Body laterally compressed, much shorter and smaller than female, not elongated, with numerous ( $33\pm$ ) fine annulations; unsclerotized except for gnathosoma, propodosomal plate, coxal apodemes and opisthosomal plate (Fig. 23). Legs I and II modified as on female. Legs III and IV with same number accessory spurs as female (Fig. 23a). Legs I and II with single seta at posterior margin of dilated flaplike plates. Leg III larger than leg IV; main claw shorter than leg IV main claw, tapers more at apex than similar claw of female; with single accessory spur similar to accessory spur on female but smaller. Single seta at posterior margin of tibia. Leg IV main claw much longer than main claw on leg III; similar to same claw on female. Single seta at posterior margin of tibia. Small microseta on inner anterior tibia apex. Flaplike clasping structures located between second and third leg pairs well developed as on female. Gnathosoma short, blunted at apex. Chelicerae not clearly delineated. Propo-





Figs. 19-25. *Pseudolabidocarpus secus*, new species, Male, Holotype, a. leg III, b. leg IV. (20) *Pseudolabidocarpus secus*, new species, copulatory female. (21) *Pseudolabidocarpus secus*, new species, Nymph. (22) *Labidocarpus dossuarius*, new species, female, Holotype, a. leg III, b. leg IV. (23) *Labidocarpus dossuarius*, new species, Male, Allotype, a. leg III, b. leg IV. (24) *Labidocarpus dossuarius*, new species, Copulatory female. (25) *Labidocarpus dossuarius*, new species, Nymph.



dosomal plate similar to female, elongate, setae not located on main plate area (Fig. 23). Claw of leg III short, straight or sharply curved (one leg may have main claw straight and short, other leg may have claw curved and almost as long as main claw of leg IV). Single large seta associated with posterior distal tibia region. Leg III with small microseta on anterior tibia edge (Fig. 23a). Accessory spurs of leg III unequal in size; spur next to base of main claw smaller than spur located near attachment of tarsus to tibia. Accessory spurs of leg IV similar to same spur on female. Propodosomal setae at posterior margin of propodosomal plate; similar in number, size, and structure to female. Lateral setae similar to female except subequal length; located near apodemes of legs III. Anal region with pair of anal suckers. Two pairs of anal setae; dorsal pair longer than opisthosomal region of body; similar structure as propodosomal and lateral setae. Ventral anals small, not longer than opisthosomal region of body. Pair of small setae placed below anal suckers (absent on female). Opisthosomal region bears sclerotized plate; anal suckers not associated with plate. Other body setae shown in Fig. 23. Length 0.167 mm, width 0.65 mm (measured between leg III and leg IV).

**LARVA:** Body laterally compressed as in adult with numerous ( $26 \pm$ ) fine annulations; sclerotized region similar to male and female. Leg III with normal development of claw and accessory setae, similar to female. Leg IV missing; legs I and II modified for clasping hair as on adults (Fig. 25). Gnathosomal length similar to male; chelicerae exposed, digits terminate with well-developed teeth. Propodosomal plate and setae well developed, similar to female. Part of hysterosomal region without annulations, contains winglike process for clasping male. Other setae shown in Fig. 25. Length 0.120 mm, width 0.55 mm (measured between legs II and III).

**TYPE DATA:** Female holotype, male allotype, 8 female and 1 male paratypes ex

*Molossus major* (SVP 9459), Bolívar, 59 km SE El Dorado, Km 74, El Manaco, 150 m elev., 17-VI-66, M. D. Tuttle and A. L. Tuttle collectors. Other material studied includes 1 copulatory female and 1 hexapod larva.

#### REMARKS

*Labidocarpus dossuarius* is distinguished by the structure of the accessory spur, the large setae of the male associated with the clasping structure between the apodemes of legs II and III, development of this clasping structure, length of the main claw of leg III, shape of the propodosomal plate and the small size of the male.

#### Genus *Paralabidocarpus* Pinichpongse

*Paralabidocarpus Pinichpongse* 1963d:620.

**TYPE SPECIES:** *Paralabidocarpus artibeii* Pinichpongse, 1963, ex *Artibeus lituratus palmarum*.

#### *Paralabidocarpus tonatiae* Fain

*Paralabidocarpus tonatiae* Fain, 1970:298.

#### DESCRIPTION (Fain, 1970)

"Distinguished from *P. artibeii* Pinichpongse by the larger size and by the greater tapering of the anterior region of the body, the unequal setae "h" and "sh." Holotype male 285  $\mu$  long 105  $\mu$  wide; allotype female 420  $\mu$  x 120  $\mu$  (lateral view)."

**TYPE DATA:** Holotype ex *Tonatia venezuelae*, Royal des Sciences Naturelles de Belgique.

#### REMARKS

Specimens of this species have not been seen. Fain's original description is given above, translated from French by the author. Illustrations were not made of this species by Fain; however, the author indicated that a forthcoming publication will include detailed description data and illustrations of this species.

#### Key to the Venezuelan Genera of Labidocarpidae

1. Legs III and IV with caruncle in addition to claws and accessory spurs .... *Paralabidocarpus*<sup>4</sup>  
    Legs III and IV without caruncle in addition to claws and accessory spurs ..... 2
2. Legs III and IV similarly armed with single main and accessory spur; main claw  
    of leg IV whiplike ..... *Labidocarpus*  
    Legs III and IV not similarly armed or, if similarly armed, main claw of leg IV not  
    whiplike ..... 3

<sup>4</sup>Recorded by Fain (1970) for *Paralabidocarpus tonatiae* Fain ex *Tonatia venezuelae*, Venezuela.



- 3. Propodosomal setae minute, barely exceeding length of setae base ..... *Alabidocarpus*  
Propodosomal setae well developed, extend beyond body region of host ..... 4
- 4. One pair of lateral setae; accessory spur of leg III modified into short, flattened, serrated structure ..... *Lawrenceocarpus*  
Two pairs of lateral setae, accessory spur of leg III not modified into short, flattened, serrated structure ..... 5
- 5. Legs III and IV with "triangular spine" in addition to main claw and accessory spurs ..... *Parakosa*  
Legs III and IV without "triangular spine"; leg III with two accessory spurs and leg IV with a single accessory spur ..... *Pseudoalabidocarpus*, new genus

HOST PARASITE LIST OF VENEZUELAN LABIDOCARPID BAT-MITES

Order - Chiroptera	Host species - <i>Anoura caudifera</i> <i>Alabidocarpus furmani</i>
Superfamily - Emballonuroidea	Subfamily - Carolliinae
Family - Noctilionidae	Host species - <i>Carollia brevicauda</i> <i>Alabidocarpus furmani</i> <i>Parakosa tadarida</i>
Host species - <i>Noctilio labialis</i> <i>Parakosa tadarida</i> <i>Parakosa maxima</i>	Host species - <i>C. perspicillata</i> <i>Alabidocarpus furmani</i>
Superfamily - Phyllostomoidea	Subfamily - Sturnirinae
Family - Mormoopidae	Host species - <i>Sturnira lilium</i> <i>Parakosa tadarida</i>
Host species - <i>Pteronotus parnellii</i> <i>Alabidocarpus furmani</i>	Subfamily - Stenoderminae
Family - Phyllostomidae	Host species - <i>Uroderma magnirostrum</i> <i>Alabidocarpus nicaraguae</i>
Subfamily - Phyllostominae	Host species - <i>Vampyrops helleri</i> <i>Alabidocarpus furmani</i> <i>Alabidocarpus jonesi</i>
Host species - <i>Micronycteris hirsuta</i> <i>Lawrenceocarpus phyllostomus</i>	Host species - <i>Artibeus harti</i> <i>Parakosa maxima</i>
Host species - <i>Tonatia venezuelae</i> <i>Paralabidocarpus tonatiae</i>	Superfamily - Vespertilionoidea
Host species - <i>Phyllostomus discolor</i> <i>Pseudoalabidocarpus secus</i>	Family - Molossidae
Host species - <i>P. elongatus</i> <i>Lawrenceocarpus phyllostomus</i> <i>Pseudoalabiocarpus secus</i>	Host species - <i>Molossus ater</i> <i>Parakosa maxima</i> <i>Parakosa tadarida</i>
Subfamily - Glossophaginae	Host species - <i>M. bondae</i> <i>Parakosa maxima</i> <i>Parakosa tadarida</i>
Host species - <i>Glossophaga longirostris</i> <i>Alabidocarpus furmani</i> <i>Parakosa tadarida</i> <i>Parakosa maxima</i>	Host species - <i>M. major</i> <i>Labidocarpus dossuarius</i> <i>Parakosa maxima</i>



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