

Oswaldofilaria medemi n. sp. (Nematoda: Filarioidea),
from the smooth-fronted caiman, *Paleosuchus trigonatus*
from Colombia

by

C. J. Marinkelle *

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Abstract: A filarial worm, *Oswaldofilaria medemi* n. sp., obtained from the thoracic wall of an adult Colombian caiman, *Paleosuchus trigonatus* (Schneider, 1801) is described. The new filaria differs from all other species of the genus by the long oesophagus and by differences in size and shape of the spiculae in the male. Microfilariae could not be found in the blood of six *P. trigonatus*.

Few filarid-like worms are known from Crocodylidae. In Asia, *Micropleura vivipara* of the family Dracunculidae was described from gaviales. In Brazil, *M. vazi* was described by Travassos (1933) from *Caiman sclerops* and *Oswaldofilaria bacillaris* was found in *Melanosuchus niger* by Molin (1858) and in *Caiman sclerops* by Travassos (1933). A distinct species of *Oswaldofilaria* was recently obtained from Colombian *Paleosuchus trigonatus* crocodillians.

Oswaldofilaria was separated from the genus *Filaria* by Travassos (1933) based on morphological differences in the buccal capsule, oesophagus, caudal extremity of worm, ovjector, spicules, caudal papillae of male and position of the vulva.

MATERIAL AND METHODS

One intact male, three intact females and three slightly damaged females of a new species of filaria were recovered from the thoracic wall of an adult smooth-fronted male caiman *Paleosuchus trigonatus* (Schneider, 1801). The recovered worms were washed in normal saline solution and preserved in 70% alcohol with 25% glycerol. Clearing was done in lactophenol. The cephalic structures of female paratypes were studied by the method described by Anderson (1958). Measurements were made on preserved, cleared specimens or on camera lucida drawings. The blood of the caiman was examined by Knott's (1939) concentration method but no microfilariae were found. In the following description all measurements are in mm.

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RESULTS

The worms found in *Paleosuchus trigonatus* belong to the genus *Oswaldofilaria* Travassos, 1933. Because of certain characteristics, this new species has been named *Oswaldofilaria medemi* n. sp., in honour of Dr. F. Medem, who for the first time collected *P. trigonatus* in Colombia.

Description: The specimens collected from the Colombian caimans showed the following characteristics: body cuticle with fine striations; stoma simple with a small but distinct buccal capsule; oesophagus long and clearly divided into an anterior short muscular part, and long broad glandular posterior part (Fig. 1); head blunt; caudal extremity digitiform in both sexes; lateral alae absent. Females are opistodelphic and viviparous: ovijector long; vulva placed a short distance behind termination of glandular oesophagus. Male with caudal papillae and spicules dissimilar and unequal.

Male: Measurements are given in the Table 1. The cuticle consists of three layers; outer layer with transverse fine striations, medial layer without striations, and smooth inner layer with fine longitudinal striations. Cephalic papillae similar to those of the female. The nerve ring is clearly visible (Fig. 1). The tail is coiled strongly. The genital systems is looped, filling pseudocoelomic space and extending to terminal portions of worm; ejaculatory duct is difficult to distinguish. Spicules are dissimilar; left spicule longer than right; spicule ratio 4.0: 1; left spicule lancet-shaped at end and with groove on ventral surface; right spicule falciform with minute lancet-shaped tip (Fig. 2); gubernaculum absent. Cloaca 0.154 from posterior end of body. Caudal papillae are sessile and equal in size; three pairs precloacal, one pair cloacal and two pairs postcloacal (Fig. 3).

TABLE 1

Measurements of Oswaldofilaria medemi n. sp.: Holotype male (1), allotype female (2), paratype females (3), and *O. bacillaris* male (4), females (5). (All measurements in mm)

| | (1) | (2) | (3) | (4) | (5) |
|-------------------------------|-------|-------|-------------|-------|-------|
| Total length | 24 | 49 | 47-50 | 20 | 45 |
| Width at level of middle body | 0.20 | 0.25 | 0.25 | 0.21 | 0.25 |
| Anterior end to nerve ring | 0.298 | 0.425 | 0.421-0.426 | 0.36 | 0.6 |
| Anterior end to vulva | — | 16.8 | 16.0-17.4 | — | 13-21 |
| Anus to tail tip | 0.154 | 0.296 | 0.290-0.299 | 0.14 | 0.35 |
| Greatest width, buccal cavity | 0.005 | 0.007 | 0.007 | 0.016 | 0.025 |
| Length, buccal cavity | 0.012 | 0.016 | 0.015-0.016 | 0.008 | 0.015 |
| Length, muscular oesophagus | 0.238 | 0.535 | 0.529-0.539 | 0.65 | 1 |
| Length, glandular oesophagus | 5.9 | 12.5 | 12.3-12.6 | 4.6 | 8 |
| Total length, oesophagus | 6.1 | 13.0 | 12.8-13.1 | 5.3 | 9 |
| Length, longer spicule | 0.366 | — | — | 0.38 | — |
| Length, shorter spicule | 0.092 | — | — | 0.18 | — |

Female: Allotype and five paratypes (range of measurements of paratypes in parenthesis). There are four pairs of submedian papillae radiating from the oral

opening; the four innermost are smaller than the outermost papillae (Fig. 4). Amphids are tiny and in line with the outermost papillae. Vagina vera is muscular; ovjector bulbous, usually directed posteriorly (Fig. 5). Convoluted, paired uteri extend to 0.0087 (0.075-0.092) from the anterior extremity (Fig. 6), and 0.050 (0.048-0.088) from the posterior extremity of body (Fig. 7). Uteri extend throughout most of the body and are filled with larvae. The coiled ovaries are confined to hindbody and extend to level of anus. Eggs are oval-shaped 0.125 x 0.108, with thin smooth shells (Fig. 8). Microfilariae dissected from the vagina and measured in cotton-blue lactophenol preparations are sheathed, with anterior end rounded, tail tapered, short cephalic space, and total length (without sheath), 0.086-0.092. Maximum width 0.0053-0.0054; nerve ring located 0.013-0.017 behind head; excretory pore 0.049-0.051; anal pore 0.020-0.024. Number of nuclei anterior to nerve ring, 29-31 (Fig. 9).

Host: *Paleosuchus trigonatus* (Schneider, 1801)

Habitat: Body cavity, thoracic wall.

Locality: Cachirri, Jacaré (Departamento de Meta), Colombia

Specimens: To be deposited in U.S.N.M. Helm. Coll.

DISCUSSION

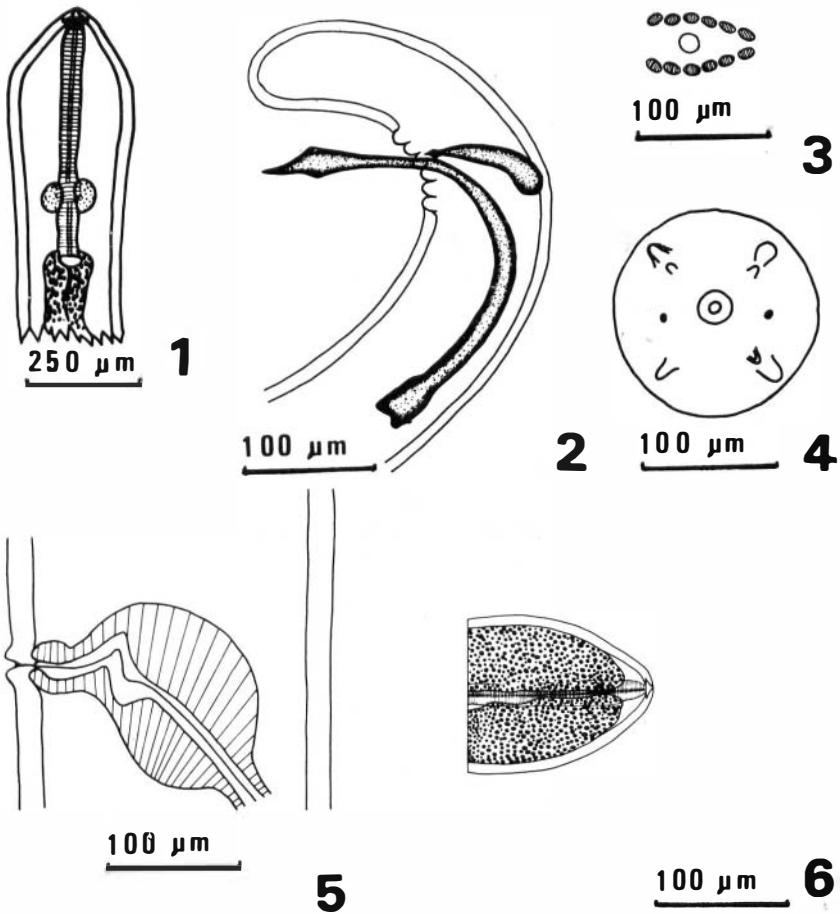
The only filarial parasite of the family Filariidae, described from the order Crocodylia, is *Oswaldofilaria bacillaris* (Molin, 1858), Travassos, 1933, formerly assigned to the genus *Filaria*. *O. medemi* differs from *O. bacillaris* in having; a) a different number and position of caudal papillae in the male, 3 pairs precloacal, 1 pair cloacal, 2 pairs postcloacal, as opposed to 2 precloacal, 3 cloacal and 2 postcloacal in *O. bacillaris*; b) a different shape of the spicules, a spicule ratio of 4.0: 1 versus 2.1: 1 in *O. bacillaris*; c) a different position of the nerve ring and the vulva; d) a narrower buccal cavity; and e) shorter muscular oesophagus (Molin, 1858; Travassos, 1933).

Four other species of *Oswaldofilaria* are known and differ from *O. medemi* by the following characteristics. *O. brevicaudata* (Rhodhain & Vuylsteke, 1937) Freitas & Lent, 1937, was formerly assigned to the genus *Breinlia*, recovered from Brazilian and Mexican lizards (*Iguana iguana*, syn. *I. tuberculata*). The buccal capsule in the male is absent. An atrophied vulva is present, located 12.75 from the anterior end. The spicule ratio is 1.9 to 2.2:1. Caudal papillae differ in number and arrangement: 4 pairs precloacal, 1 pair cloacal, 3 pairs postcloacal, and often an additional unpaired precloacal papilla (Freitas & Lent, 1937).

O. carinii (Vaz & Pereira, 1935) Barus & Sonin, 1968 originally placed in the genus *Macdonaldius* and later assigned to the genus *Piratuba*, was recovered from a Brazilian snake (*Elapomorphus tricolor*). The glandular part of the oesophagus appears to be absent. The spicular ratio is 1.6 to 1.9:1. There are 3 pairs precloacal and 5 pairs postcloacal papillae and the cephalic papillae are absent (Barus & Sonin, 1968; Vaz & Pereira, 1935).

O. chlamydosauri (Breinl, 1913) Johnston & Mawson, 1943, was formerly assigned to the genus *Foleyella*, recovered from Australian agamids (*Chlamydosaurus kingii*, *Amphibolurus barbatus* and *A. muricatus*). Spicule ratio is 1.6: 1. There are 5 pairs precloacal, 3 pairs postcloacal and 2 pairs caudal papillae near the tip of the tail.

The buccal capsule is absent. The male tail bears two small papillae near to the tip of the tail (Johnston & Mawson, 1943). The unsheathed microfilariae



Oswaldofilaria medemi n. sp.

- Fig. 1. Ventral view of anterior end of male.
- Fig. 2. Lateral view of posterior end of male with spicules.
- Fig. 3. Diagrammatic representation of the arrangement of caudal papillae in the male.
- Fig. 4. Front view of female head with cephalic papillae.
- Fig. 5. Lateral view of ovijector.
- Fig. 6. Ventral view of anterior end of female.

described by Breinl *et al.* (1913) are very similar to the sheathed larvae dissected from *O. medemi*.

O. pfugfelderii (Frank, 1964) Barus & Sonin, 1968 was formerly assigned to the genus *Macdonaldius*, also recovered from an Australian agamid lizard (*Physignathus leseuerii*). The spicule ratio is 2.4: 1. There are 4 or 5 pairs precloacal, 3 pairs postcloacal and 1 pair of caudal papillae. The caudal papillae are

located 0.025 from the tip of the tail. The sheathed microfilariae described by Frank (1964) are nearly twice as long as those of *O. medemi*.

O. medemi differs from all other species in the genus by 1) the greater total length of the oesophagus; 2) the different size of the shorter spicule; 3) the spicule ratio; and 4) the shape of both spicules.

The square cuticular shield, surrounding the cephalic papillae as a characteristic of the genus mentioned by Anderson (1968), could not be distinguished.

The blood of six other caimans examined by Knott's concentration method (1939) did not show microfilariae. Although the vector is unknown, F. Medem (pers. communication) found tabanids *Tabanus (T.) fervens* (L.) and *T. (N.) modestus* (Wied) feeding on the snout of *P. trigonatus*.

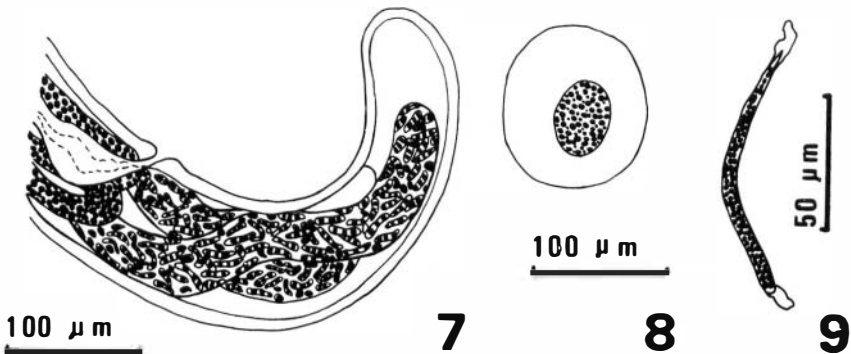


Fig. 7. Lateral view of posterior end of female.

Fig. 8. Egg.

Fig. 9. Microfilaria dissected from vagina.

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RESUMEN

Se describe una filaria, *Oswaldofilaria medemi* n. sp., aislada de la pared torácica de un caimán adulto de Colombia, *Paleosuchus trigonatus* (Schneider, 1801). La filaria difiere de todas las demás especies del género por su esófago largo y por diferencias en el tamaño y forma de las espículas del macho. No se encontró microfilarias en la sangre de seis *P. trigonatus*.

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A list of ectoparasites of Colombian bats

by

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Abstract: Of 3,860 Colombian bats, belonging to 109 species, 1,235 individuals (32%) of 100 species were infested with ectoparasites. A total of 3,545 ectoparasites pertaining to 88 species were obtained (**Mesostigmata:** 1 Halarachnidae; 19 Macronyssidae; 4 Spelaeorhynchidae; 104 Spinturnicidae. **Ixodides:** 449 Argasidae. **Trombidiformes:** 1 Spelognathidae; 340 Trombiculidae. **Sarcoptiformes:** 170 Listrophoridae. **Hemiptera:** 16 Cimidae; 4 Polycetenidae. **Diptera:** 7 Nycteribiidae; 2405 Streblidae. **Siphonaptera:** 25 Pulicidae). No ectoparasites were recovered from 9 species of bats.

Bats may harbor numerous micro-organisms and parasites which are capable of infecting man or domestic animals (Marinkelle and Grose, 1972). Some of these organisms can be transmitted by ectoparasites from one host to another (Constantine, 1970; Tamsitt and Valdivieso, 1970). Knowledge of the existing species of ectoparasites of bats is of importance for a better understanding of certain epidemiological problems (Marinkelle, 1966).

Very little literature exists on the ectoparasites of Colombian bats (Anciaux de Faveaux, 1971; Boshell and Kerr, 1942; Brennan, 1970 a, b; Clark, 1967; Kohls *et al.*, 1969; Machado-Allison and Antequera, 1969; Marinkelle, 1967; Wenzel, 1970; Wenzel and Tipton, 1966).

METHODS

We examined 3,860 bats for ectoparasites immediately after death, the bats were separately packed in white paper bags to avoid mixing up of parasites from different bat species and transported to Bogota in dry-ice. The parasites were collected and preserved by standard techniques. Nasal washings with saline solution were used to recover intranasal mites; magnification for examination was between 60 and 240 X. No skin scrapings were carried out. Many preserved parasites were

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shipped to specialists for identification or verification of preliminary identifications (see Acknowledgements).

RESULTS

From 3,860 bats of 109 species, only 1,235 bats (32 percent) belonging to 100 species were infested with ectoparasites. A total of 3,545 ectoparasites of 88 species were obtained (Table I). No ectoparasites were found on 9 bat species.

The parasites marked with an asterisk (*) in Table 1 represent new records for Colombia.

DISCUSSION

Since 1961, when we began our search for ectoparasites of bats, 53 of those listed were described as new taxa, 56 were recorded for the first time from Colombia, and 52 new bat host species were found to be infested.

Certainly more species have yet to be recovered from bats and the role of the ectoparasite in transmission of diseases is still a virgin field for research. The list of ectoparasites in this publication may facilitate further work in related fields.

Very few temporary parasites such as Cimicidae, Siphonaptera and Nycteribiidae are recorded, probably due to the fact that no efforts were made to collect ectoparasites in the field immediately from live animals. Few Trombidiformes were found since no skin scrapings were made for the detection of intradermal chiggers. Although *Cavernicola pilosa* were often found associated with bats in the vicinity of their roosts, they were never found on the bats themselves.

TABLE 1

Ectoparasites of Colombian bats

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|--|---------------------|----------------|------------------------------|
| <i>Alabidocarpus</i> Ewing (Listrophoridae) | 50 | 546 | <i>Pteronotus psilotis</i> |
| | 20 | 3 | <i>Pteronotus davyi</i> |
| | 50 | 88 | <i>Artibeus lituratus</i> |
| | 50 | 201 | <i>Molossus molossus</i> * |
| * <i>Anastrebla modestini</i> Wenzel (Streblidae) | 5 | 20 | <i>Anoura gecffroyi</i> |
| | 1 | 4 | <i>Lionycteris spurelli</i> |
| * <i>Anatrichobius scorzai</i> Wenzel (Streblidae) | 1 | 20 | <i>Myotis albescens</i> |
| * <i>Antricola mexicanus</i> Hoffmann (Argasidae) | 7 | 546 | <i>Pteronotus psilotis</i> |
| | 41 | 360 | <i>Mormoops megalophylla</i> |
| <i>Aspidoptera busckii</i> Coquillett (Streblidae) | 2 | 22 | <i>Sturnira lilium</i> |
| | 1 | 88 | <i>Artibeus lituratus</i> |
| * <i>A. delatorrei</i> Wenzel (Streblidae) | 6 | 22 | <i>Sturnira lilium</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|--|---------------------|----------------|-------------------------------|
| | 1 | 1 | <i>Sturnira magna</i> |
| | 2 | 21 | <i>Sturnira tildae</i> |
| | 1 | 300 | <i>Desmodus rotundus</i> |
| * <i>Basilis</i> n. sp.? (according to Peterson) (Nycteribiidae) | 4 | 1 | <i>Eptesicus fuscus</i> |
| | 1 | 30 | <i>Vampyrops helleri</i> |
| | 1 | 4 | <i>Vampyrops vittatus</i> |
| | 1 | 10 | <i>Myotis nigricans</i> |
| * <i>Beamerella acutascuta</i> Brennan (Trombiculidae) | 3 | 360 | <i>Mormoops megalophylla</i> |
| * <i>Beamerella</i> n. sp.? (according to Brennan) (Trombiculidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 300 | <i>Desmodus rotundus</i> |
| <i>Blankaartia sinnamaryi</i> (Floch & Fauran) (Trombiculidae) | 1 | 12 | <i>Tadarida laticaudata</i> |
| * <i>Cameronieta thomasi</i> Machado-Allison (Spinturnicidae) | 17 | 45 | <i>Pteronotus parnelli</i> |
| | 2 | 62 | <i>Pteronotus suapurensis</i> |
| <i>Cimex hemipterus</i> (Fabricius) (Cimicidae) | 12 | 82 | <i>Peropteryx macrotis</i> |
| | 4 | 4 | <i>Peropteryx kappleri</i> |
| <i>Exastinion clovisi</i> (Pessoa & Guimaraes) (Streblidae) | 9 | 20 | <i>Anoura geoffroyi</i> |
| Halarachnidae (unidentified genus) | 1 | 546 | <i>Pteronotus psilotis</i> |
| <i>Hesperoctenes fumarinus</i> (Westwood), (Polycetenidae) | 3 | 71 | <i>Molossus bondae</i> |
| <i>Macronyssoides kochi</i> Fonseca (Macronyssidae) | 1 | 3 | <i>Eptesicus brasiliensis</i> |
| | 1 | 1 | <i>Eptesicus melanopterus</i> |
| * <i>Mastoptera guimaraesi</i> Wenzel (Streblidae) | 11 | 144 | <i>Phyllostomus hastatus</i> |
| <i>M. minuta</i> Costalima (Streblidae) | 3 | 144 | <i>Phyllostomus hastatus</i> |
| <i>Megistopoda aranea</i> (Coquillet) (Streblidae) | 1 | 36 | <i>Phyllostomus discolor</i> |
| | 1 | 2 | <i>Vampyriscus bidens</i> |
| | 1 | 30 | <i>Artibeus jamaicensis</i> |
| | 2 | 88 | <i>Artibeus lituratus</i> |
| | 1 | 12 | <i>Artibeus cinereus</i> |
| | 1 | 2 | <i>Artibeus pumilio</i> |
| * <i>M. proxima</i> (Seguy) (Streblidae) | 1 | 22 | <i>Sturnira lilium</i> |
| | 1 | 4 | <i>Sturnira bidens</i> |
| | 1 | 15 | <i>Uroderma bilobatum</i> |
| | 1 | 4 | <i>Uroderma magnirostris</i> |
| | 1 | 10 | <i>Chiroderma villosum</i> |
| | 1 | 30 | <i>Artibeus jamaicensis</i> |
| <i>Metalasmus pseudopterus</i> Coquillet (Streblidae) | 1 | 30 | <i>Artibeus jamaicensis</i> |
| <i>Nasicola annereauxi</i> Brennan & Yunker (Trombiculidae) | 1 | 144 | <i>Phyllostomus hastatus</i> |
| * <i>Neospeleognathopsis phyllostomi</i> Clark (Spelaeorhynchidae) | 3 | 144 | <i>Phyllostomus hastatus</i> |
| * <i>Neotrichobius delicatus</i> Machado-Allison (Streblidae) | 1 | 15 | <i>Uroderma bilobatum</i> |
| * <i>Noctiliostrebula maai</i> Wenzel (Streblidae) | 33 | 80 | <i>Noctilio labialis</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|---|---------------------|----------------|--------------------------------|
| * <i>N. traubi</i> Wenzel | 9 | 3 | <i>Noctilio leporinus</i> |
| * <i>Nycterophilia fairchildi</i> Wenzel (Streblidae) | 20 | 360 | <i>Mormoops megalophylla</i> |
| | 9 | 45 | <i>Pteronotus parnelli</i> |
| | 195 | 546 | <i>Pteronotus psilotis</i> |
| | 22 | 62 | <i>Pteronotus suapurensis</i> |
| * <i>N. parnelli</i> Wenzel (Streblidae) | 1 | 82 | <i>Peropteryx macrotis</i> |
| | 1 | 546 | <i>Pteronotus psilotis</i> |
| * <i>Nycterophilia</i> n. sp.? (according to Wenzel) (Streblidae) | 29 | 360 | <i>Mormoops megalophylla</i> |
| | 2 | 45 | <i>Pteronotus parnelli</i> |
| | 2 | 62 | <i>Pteronotus suapurensis</i> |
| | 1 | 1 | <i>Micronycteris minuta</i> |
| | 1 | 1 | <i>Micronycteris hirsuta</i> |
| | 1 | 300 | <i>Desmodus rotundus</i> |
| | 1 | 201 | <i>Molossus molossus</i> |
| * <i>Nycterophilia</i> n. sp.? (according to Wenzel) (Streblidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| * <i>Ornithodoros azteci</i> Matheson (Argasidae) | 46 | 82 | <i>Peropteryx macrotis</i> |
| | 3 | 259 | <i>Glossophaga soricina</i> |
| | 1 | 2 | <i>Leptonycteris curasoae</i> |
| | 1 | 503 | <i>Carollia perspicillata</i> |
| | 1 | 1 | <i>Chiroderma trinitatum</i> |
| | 143 | 30 | <i>Artibeus jamaicensis</i> |
| | 63 | 300 | <i>Desmodus rotundus</i> |
| * <i>O. brodyi</i> Matheson (Argasidae) | 4 | 503 | <i>Carollia perspicillata</i> |
| | 2 | 216 | <i>Natalus tumidirostris</i> |
| * <i>O. hasei</i> (Schulze) (Argasidae) | 2 | 3 | <i>Noctilio leporinus</i> |
| | 4 | 80 | <i>Noctilio labialis</i> |
| | 1 | 36 | <i>Phyllostomus discolor</i> |
| | 54 | 30 | <i>Artibeus jamaicensis</i> |
| | 2 | 1 | <i>Rhogeessa parvula</i> |
| | 1 | 1 | <i>Lasiurus cinereus</i> |
| | 3 | 201 | <i>Molossus molossus</i> |
| * <i>Ornithodoros</i> close to <i>hasei</i> (Schulze) (Argasidae) | 1 | 80 | <i>Noctilio labialis</i> |
| | 1 | 1 | <i>Vampyressa nymphaea</i> |
| | 1 | 30 | <i>Artibeus jamaicensis</i> |
| * <i>O. marinkellei</i> Kohls, Clifford & Jones (Argasidae) | 49 | 45 | <i>Pteronotus parnelli</i> |
| | 5 | 546 | <i>Pteronotus psilotis</i> |
| * <i>O. rossi</i> Kohls, Sonnenshine & Clifford (Argasidae) | 1 | 1 | <i>Micronycteris megalotis</i> |
| | 4 | 300 | <i>Desmodus rotundus</i> |
| * <i>O. yumatensis</i> (Cooley & Kohls) (Argasidae) | 7 | 82 | <i>Peropteryx macrotis</i> |
| | 1 | 4 | <i>Sarcopteryx bilineata</i> |
| <i>Paradyschiria parvula</i> Falcoz (Streblidae) | 6 | 3 | <i>Noctilio leporinus</i> |
| | 203 | 80 | <i>Noctilio labialis</i> |
| * <i>P. parvuloides</i> Wenzel (Streblidae) | 2 | 80 | <i>Noctilio labialis</i> |
| <i>Paraeuctenodes longipes</i> Pessoa & | 1 | 546 | <i>Carollia perspicillata</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|--|---------------------|----------------|---------------------------------|
| Guimaraes (Strebliidae) | | | |
| <i>Paratrichobius "longicrus" complex"</i> | 1 | 144 | <i>Phyllostomus hastatus</i> |
| (Strebliidae) | 1 | 8 | <i>Ectophylla macconnelli</i> |
| | 3 | 88 | <i>Artibeus lituratus</i> |
| | 1 | 3 | <i>Artibeus concolor</i> |
| | 2 | 12 | <i>Molossops temminckii</i> |
| | 1 | 1 | <i>Molossops planirostris</i> |
| * <i>Periglischrus acutisternus</i> Machado-Allison (Spinturnicidae) | 3 | 36 | <i>Phyllostomus discolor</i> |
| | 2 | 144 | <i>Phyllostomus hastatus</i> |
| * <i>P. herrerae</i> Machado-Allison (Spinturnicidae) | 3 | 300 | <i>Desmodus rotundus</i> |
| <i>P. iheringi</i> Oudemans (Spinturnicidae) | 1 | 259 | <i>Glossophaga soricina</i> |
| | 11 | 12 | <i>Glossophaga longirostris</i> |
| | 26 | 88 | <i>Artibeus lituratus</i> |
| | 2 | 3 | <i>Artibeus concolor</i> |
| * <i>P. ojasii</i> Machado-Allison (Spinturnicidae) | 1 | 22 | <i>Sturnira lilium</i> |
| | 2 | 11 | <i>Sturnira ludovici</i> |
| * <i>P. torreatbai</i> Machado-Allison (Spinturnicidae) | 4 | 22 | <i>Sturnira lilium</i> |
| * <i>P. setosus</i> Machado-Allison (Spinturnicidae) | 6 | 259 | <i>Glossophaga soricina</i> |
| | 1 | 1 | <i>Choeroniscus minor</i> |
| | 1 | 88 | <i>Artibeus lituratus</i> |
| Polyctenidae, unidentified genus | 1 | 30 | <i>Eumops trumbulli</i> |
| * <i>Radfordiella carolliae</i> Radovsky (Macronyssidae) | 1 | 503 | <i>Carollia perspicillata</i> |
| * <i>R. desmodi</i> Radovsky (Macronyssidae) | 1 | 503 | <i>Carollia perspicillata</i> |
| * <i>Radfordiella</i> sp. near <i>R. oudemanni</i> Fonseca (Macronyssidae) | 1 | 13 | <i>Rhynchonycteris naso</i> |
| <i>Rhynchopsylla pulex</i> Haller (Pulicidae) | 1 | 1 | <i>Molossops greenhalli</i> |
| | 21 | 201 | <i>Molossus molossus</i> |
| | 1 | 4 | <i>Tadarida brasiliensis</i> |
| | 2 | 3 | <i>Eumops glaucinus</i> |
| <i>Speiseria ambigua</i> Kessel (Strebliidae) | 1 | 2 | <i>Lonchophylla robusta</i> |
| | 1 | 1 | <i>Lonchophylla thomasi</i> |
| | 29 | 503 | <i>Carollia perspicillata</i> |
| | 1 | 21 | <i>Carollia subrufa</i> |
| | 1 | 12 | <i>Carollia castanea</i> |
| | 5 | 88 | <i>Artibeus lituratus</i> |
| | 1 | 2 | <i>Artibeus watsoni</i> |
| * <i>Spelaorhynchus</i> sp. (Spelaorhynchidae) | 1 | 503 | <i>Carollia perspicillata</i> |
| Speleognathidae (unidentified genus) | 1 | 30 | <i>Eumops trumbulli</i> |
| <i>Spinturnix americanus</i> (Banks) (Spinturnicidae) | 20 | 10 | <i>Myotis nigricans</i> |
| <i>S. bakeri</i> Rudnick (Spinturnicidae) | 2 | 1 | <i>Histiotus montanus</i> |
| * <i>Steatonyssus</i> sp. near <i>occidentalis</i> Ewing (Macronyssidae) | 14 | 1 | <i>Histiotus montanus</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|---|---------------------|----------------|------------------------------------|
| <i>*Strebla altmani</i> Wenzel (Streblidae) | 2 | 10 | <i>Macrophyllum macrophyllum</i> |
| | 2 | 2 | <i>Natalus stramineus</i> |
| <i>*S. alvarezi</i> Wenzel (Streblidae) | 1 | 144 | <i>Phyllostomus hastatus</i> |
| <i>*S. desmodi</i> Wenzel (Streblidae) | 42 | 300 | <i>Desmodus rotundus</i> |
| | 1 | 1 | <i>Histiotus montanus</i> |
| | 1 | 1 | <i>Lasiurus ega</i> |
| | 1 | 1 | <i>Lasiurus borealis</i> |
| | 11 | 201 | <i>Molossus molossus</i> |
| <i>*S. diaemi</i> Wenzel (Streblidae) | 2 | 22 | <i>Sturnira lilium</i> |
| | 3 | 2 | <i>Diaemus youngii</i> |
| | 2 | 1 | <i>Diphylla ecaudata</i> |
| <i>*S. carolliae</i> Wenzel (Streblidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 259 | <i>Glossophaga soricina</i> |
| | 1 | 1 | <i>Lonchophylla mordax</i> |
| | 1 | 17 | <i>Anoura caudifera</i> |
| | 1 | 1 | <i>Choeroniscus godmani</i> |
| | 56 | 501 | <i>Carollia perspicillata</i> |
| | 7 | 21 | <i>Carollia subrufa</i> |
| | 1 | 10 | <i>Chiroderma villosum</i> |
| | 1 | 10 | <i>Myotis nigricans</i> |
| <i>*S. consocius</i> Wenzel (Streblidae) | 15 | 144 | <i>Phyllostomus hastatus</i> |
| <i>*S. hertigi</i> Wenzel (Streblidae) | 3 | 144 | <i>Phyllostomus hastatus</i> |
| <i>S. wiedemanni</i> Kolenati (Streblidae) | 1 | 82 | <i>Peropteryx macrotis</i> |
| | 3 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 10 | <i>Macrophyllum macrophyllum</i> |
| | 1 | 1 | <i>Phylloderma stenops</i> |
| | 9 | 546 | <i>Carollia perspicillata</i> |
| | 1 | 30 | <i>Artibeus jamaicensis</i> |
| | 4 | 88 | <i>Artibeus lituratus</i> |
| | 1 | 1 | <i>Sphaeronycteris toxophyllum</i> |
| | 232 | 300 | <i>Desmodus rotundus</i> |
| | 5 | 2 | <i>Natalus stramineus</i> |
| | 1 | 10 | <i>Myotis nigricans</i> |
| | 1 | 1 | <i>Eumops perotis</i> |
| | 1 | 1 | <i>Eumops auripendulus</i> |
| | 2 | 71 | <i>Molossus bondae</i> |
| <i>*Tecomatlana subacutascuta</i> Vercammen (Trombiculidae) | 1 | 30 | <i>Artibeus jamaicensis</i> |
| <i>Trichoboides perspicillatus</i> (Pessoa & Galvao) (Streblidae) | 61 | 36 | <i>Phyllostomus discolor</i> |
| | 1 | 1 | <i>Trachops cirrhosus</i> |
| | 1 | 88 | <i>Artibeus lituratus</i> |
| | 2 | 201 | <i>Molossus molossus</i> |
| | 2 | 100 | <i>Molossus obscurus</i> |
| | 21 | 201 | <i>Molossus pretiosus</i> |
| <i>Trichobius costalimai</i> Guimaraes (Streblidae) | 11 | 36 | <i>Phyllostomus discolor</i> |
| | 2 | 503 | <i>Carollia perspicillata</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|---|---------------------|----------------|----------------------------------|
| | 10 | 12 | <i>Carollia castanea</i> |
| | 1 | 88 | <i>Artibeus lituratus</i> |
| | 31 | 201 | <i>Molossus molossus</i> |
| | 10 | 201 | <i>Molossus pretiosus</i> |
| <i>T. diaemi</i> Wenzel (Streblidae) | 2 | 2 | <i>Diaemus youngii</i> |
| <i>T. dugesii</i> Townsend (Streblidae) | 7 | 259 | <i>Glossophaga soricina</i> |
| | 2 | 88 | <i>Artibeus lituratus</i> |
| * <i>T. dugesioides</i> Wenzel (Streblidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 503 | <i>Carollia perspicillata</i> |
| | 2 | 201 | <i>Molossus molossus</i> |
| | 1 | 1 | <i>Molossus sinaloae</i> |
| * <i>T. furmani</i> Wenzel (Streblidae) | 8 | 300 | <i>Desmodus rotundus</i> |
| * <i>T. galei</i> Wenzel (Streblidae) | 2 | 10 | <i>Macrophyllum macrophyllum</i> |
| | 2 | 10 | <i>Natulus stramineus</i> |
| | 1 | 201 | <i>Molossus molossus</i> |
| * <i>T. joblingi</i> Wenzel (Streblidae) | 4 | 13 | <i>Rhynchonycteris naso</i> |
| | 1 | 2 | <i>Phyllostomus elongatus</i> |
| | 1 | 1 | <i>Phyllostomus latifolius</i> |
| | 4 | 259 | <i>Glossophaga soricina</i> |
| | 1 | 17 | <i>Anoura caudifera</i> |
| | 278 | 503 | <i>Carollia perspicillata</i> |
| | 18 | 21 | <i>Carollia subrufa</i> |
| | 1 | 4 | <i>Rhynophylla pumilio</i> |
| | 2 | 22 | <i>Sturnira lilium</i> |
| | 1 | 21 | <i>Sturnira tildae</i> |
| | 1 | 2 | <i>Vampyrodes caraccioli</i> |
| | 7 | 88 | <i>Artibeus lituratus</i> |
| | 21 | 300 | <i>Desmodus rotundus</i> |
| | 1 | 10 | <i>Myotis nigricans</i> |
| | 2 | 201 | <i>Molossus molossus</i> |
| | 1 | 3 | <i>Molossus ater</i> |
| * <i>T. johnsonae</i> Wenzel (Streblidae) | 4 | 546 | <i>Pteronotus psilotis</i> |
| * <i>T. lonchophyllae</i> Wenzel (Streblidae) | 1 | 2 | <i>Lonchophylla robusta</i> |
| <i>T. longipes</i> (Rudow) (Streblidae) | 7 | 3 | <i>Noctilio leporinus</i> |
| | 9 | 144 | <i>Phyllostomus hastatus</i> |
| | 1 | 2 | <i>Phyllostomus elongatus</i> |
| | 7 | 1 | <i>Vampyrum spectrum</i> |
| <i>T. parasiticus</i> Gervais (Streblidae) | 9 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 546 | <i>Pteronotus psilotis</i> |
| | 1 | 1 | <i>Micronycteris brachyotis</i> |
| | 1 | 10 | <i>Macrophyllum macrophyllum</i> |
| | 1 | 2 | <i>Lonchophylla robusta</i> |
| | 3 | 546 | <i>Carollia perspicillata</i> |
| | 1 | 2 | <i>Vampyressa pusilla</i> |
| | 1 | 30 | <i>Artibeus lituratus</i> |

TABLE 1 (Cont.)

| Parasites in alphabetical order | Number of parasites | Number of bats | Hosts in phylogenetic order |
|--|---------------------|----------------|--------------------------------|
| | 1 | 30 | <i>Artibeus Jamaicansis</i> |
| | 5 | 88 | <i>Artibeus lituratus</i> |
| | 1 | 20 | <i>Enchistenes hartii</i> |
| | 746 | 300 | <i>Desmodus rotundus</i> |
| <i>T. uniformis</i> Curran (Streblidae) | 10 | 259 | <i>Glossophaga soricina</i> |
| | 1 | 1 | <i>Lichonycteris obscura</i> |
| | 1 | 88 | <i>Artibeus lituratus</i> |
| * <i>Trichobius</i> probably 3 n. spp. (according to Wenzel) (Streblidae) | 1 | 13 | <i>Rhynchonycteris naso</i> |
| | 1 | 41 | <i>Sturnira erythromos</i> |
| | 2 | 2 | <i>Natalus stramineus</i> |
| * <i>Trombicula carmenae</i> Brennan & Jones (Trombiculidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| | 11 | 21 | <i>Sturnira tildae</i> |
| * <i>T. macrozota</i> Brennan & Jones (Trombiculidae) | 3 | 360 | <i>Mormoops megalophylla</i> |
| * <i>T. monops</i> Brennan & Jones (Trombiculidae) | 1 | 360 | <i>Mormoops megalophylla</i> |
| <i>T. saccopteryx</i> Brennan & Jones (Trombiculidae) | 76 | 13 | <i>Rhynchonycteris naso</i> |
| | 36 | 4 | <i>Saccopteryx bilineata</i> |
| | 1 | 2 | <i>Saccopteryx canescens</i> |
| | 7 | 503 | <i>Carollia perspicillata</i> |
| <i>T. vesperuginis</i> Brennan & Jones (Trombiculidae) | 3 | 13 | <i>Rhynchonycteris naso</i> |
| | 2 | 360 | <i>Mormoops megalophylla</i> |
| | 1 | 1 | <i>Lonchorhina aurita</i> |
| | 8 | 2 | <i>Mimon cozumelae</i> |
| | 99 | 503 | <i>Carollia perspicillata</i> |
| | 13 | 21 | <i>Carollia subrufa</i> |
| | 21 | 21 | <i>Sturnira tildae</i> |
| | 10 | 15 | <i>Vampyrops dorsalis</i> |
| | 2 | 20 | <i>Vampyrops intermedius</i> |
| | 10 | 300 | <i>Desmodus rotundus</i> |
| | 11 | 201 | <i>Molossus molossus</i> |
| <i>Whartonia guerrerensis</i> Hoffmann (Trombiculidae) | 6 | 360 | <i>Mormoops megalophylla</i> |
| <i>W. nudosetosa</i> (Wharton) (Trombiculidae) | 4 | 504 | <i>Carollia perspicillata</i> |
| | 3 | 301 | <i>Desmodus rotundus</i> |
| | 3 | 201 | <i>Molossus pretiosus</i> |
| Absence of ectoparasites | 0 | 1 | <i>Cormura brevirostris</i> |
| | 0 | 2 | <i>Lonchorhina orinocensis</i> |
| | 0 | 1 | <i>Mimon crenulatum</i> |
| | 0 | 1 | <i>Vampyrops lineatum</i> |
| | 0 | 1 | <i>Vampyrops recifinus</i> |
| | 0 | 2 | <i>Artibeus fuliginosus</i> |
| | 0 | 2 | <i>Thyroptera tricolor</i> |
| | 0 | 1 | <i>Myotis simus</i> |
| | 0 | 2 | <i>Eumops bonariensis</i> |

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RESUMEN

De 3.860 murciélagos colombianos pertenecientes a 109 especies, 1.235 (32%), pertenecientes a 100 especies se encontraron infestados con ectoparásitos. Un total de 3.545 ectoparásitos fueron obtenidos, pertenecientes a 88 especies diferentes (**Mesostigmata**: 1 Halarachnidae; 19 Macronyssidae; 4 Spelaeorrhynchidae; 104 Spinturnicidae. **Ixodides**: 449 Argasidae. **Trombidiformes**: 1 Spelognathidae; 340 Trombiculidae. **Sarcoptiformes**: 170 Listrophoridae. **Hemiptera**: 16 Cimicidae; 4 Polyctenidae. **Diptera**: 7 Nycteribiidae; 2405 Streblidae. **Siphonaptera**: 25 Pulicidae). No se encontraron ectoparásitos en 9 especies de murciélagos.

ZUSAMMENFASSUNG

Von 3860 untersuchten kolombianischen Fledermäusen, die zu 109 Arten gehören zeigten 1235 (32%) zu 100 Arten gehörende Tiere Befall mit Ektoparasiten. Im ganzen wurden 3545 Ektoparasiten gefunden, die zu 88 verschiedenen Arten gehören (**Mesostigmata**: 1 Halarachnidae; 19 Macronyssidae, 4 Spelaeorrhynchidae; 104 Spinturnicidae. **Ixodides**: 449 Argasidae. **Trombidiformes**: 1 Spelognathidae; 340 Trombiculidae. **Sarcoptiformes**: 170 Listrophoridae. **Hemiptera**: 16 Cimicidae; 4 Polyctenidae. **Diptera**: 7 Nycteribiidae, 2405

Streblidae, Siphonaptera: 25 Pulicidae). Neun Arten von Fledermäusen waren frei von Parasiten.

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