

**A new species and first record of the subgenus *Forcipomyia*  
(*Schizoforcipomyia*) Chan & LeRoux from the Neotropical Region  
(Diptera: Ceratopogonidae)**

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**Abstract**

The biting midge, *Forcipomyia* (*Schizoforcipomyia*) *harpa* n. sp., is described from adult males and females which are apparently restricted to high elevations in the Talamanca Mountains of Costa Rica. The new species represents the first record of the subgenus from the Neotropical Region. Thirteen species of *Forcipomyia* (*Schizoforcipomyia*) are now known worldwide.

**Key words:** Biting midge, *Forcipomyia* (*Schizoforcipomyia*), new species, Costa Rica

**Resumen**

Sobre la base de adultos machos y hembras se describe a *Forcipomyia* (*Schizoforcipomyia*) *harpa* n. sp., de Costa Rica, la cual se halla restringida a altas elevaciones en las montañas de Talamanca. Esta nueva especie representa el primer registro del subgénero para la Región Neotropical. Trece especies de *Forcipomyia* (*Schizoforcipomyia*) se conocen ahora para todo el Mundo.

**Palabras Clave:** Purruja, *Forcipomyia* (*Schizoforcipomyia*), especie nueva, Costa Rica

**Introduction**

The genus *Forcipomyia* Meigen is one of the most diverse genera within the biting midges, with 1029 species belonging to 31 subgenera. One of these subgenera, *Schizoforcipomyia* Chan & LeRoux, includes rather elegantly patterned adults, and there are cur-

rently 13 species, including the new species, distributed nearly worldwide (Table 1). Within the New World, only one species, *F. (S.) cinctipes* (Coquillett) has been previously recognized, which is distributed from Maryland and Virginia south to Florida. As part of our continuing investigation of the Ceratopogonidae fauna of Costa Rica, we herein describe a second species, from the mountains of Costa Rica, the first record of the subgenus from the Neotropical Region.

### Material and methods

All specimens were mounted on microscope slides using the technique described by Borkent & Bissett (1990). One male and three females of *F. (S.) cinctipes* were studied for comparative purposes (USNM). Terms for structures follow those used in the Manual of Nearctic Diptera (McAlpine et al., 1981). Terms for wing veins follow the system of the Manual of Nearctic Diptera, with recent modifications as proposed by Szadziewski (1996).

Specimens are deposited in the following collections:

CNCI Canadian National Collection of Insects, Ottawa, Ontario, Canada.

MLPA Museo de la Plata, Facultad de Ciencias Naturales y Museo, Universidad Nacional de La Plata, Argentina.

INBC Instituto Nacional de Biodiversidad, Santo Domingo de Heredia, Costa Rica.

USNM National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA.

### Acknowledgments

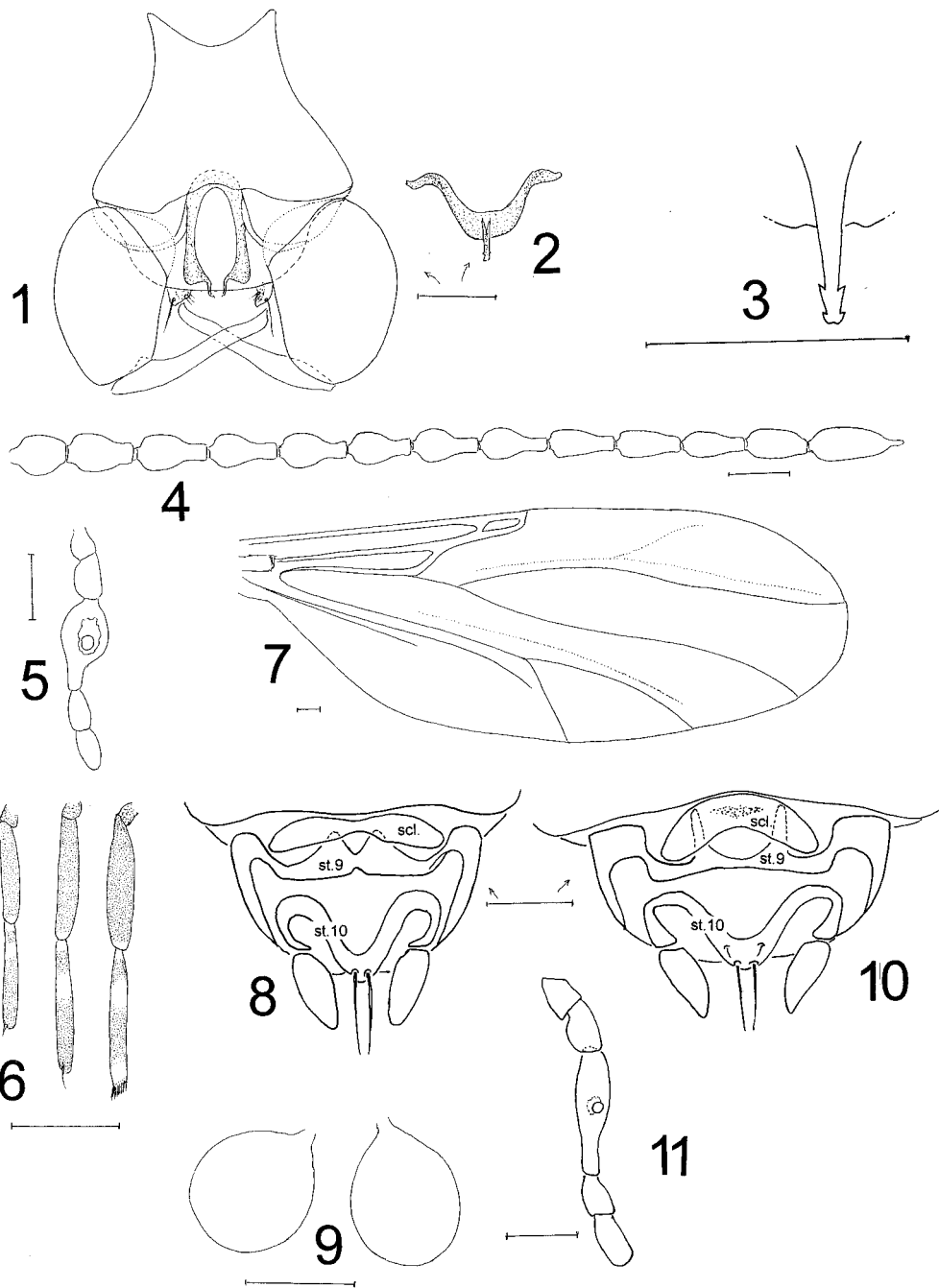
The junior author is supported in large measure by his wife Annette and he extends, once again, his deep appreciation. We thank Dave G. Furth and Nancy Adams (USNM) for the loan of *F. cinctipes* specimens for comparative purposes. Annia Picado (INBio) collected some of the specimens in this study and used her remarkable skills to mount all material on slides. Without her this study would not have been possible. Cristian Granados Vindas (INBio) produced the distribution map for this paper and we thank him for this effort. We acknowledge the support of the Global Environment Facility of the World Bank through the "Biodiversity Resources Development Project" developed by the National Institute of Biodiversity (INBio), the National System of Conservation Areas (SINAC), Ministry of the Environment and Energy (MINAE) in Costa Rica. El Servicio de Parques Nacionales kindly provided permission to the junior author to collect in the numerous National Parks and Reserves in Costa Rica. We express our thanks to William L. Grogan, Salisbury State University, Maryland, USA, for a critical review of this paper.

*Forcipomyia (Schizoforcipomyia) harpa* n. sp. Spinelli & Borkent  
(Figs. 1–9)

Diagnosis.— Male: only species of *Schizoforcipomyia* in which each paramere is swollen subapically and with a narrow apex. Female is the only New World species of *Schizoforcipomyia* having flagellomeres 3–8 with elongate distal portions or with only one pair of setae on abdominal sternite 10.

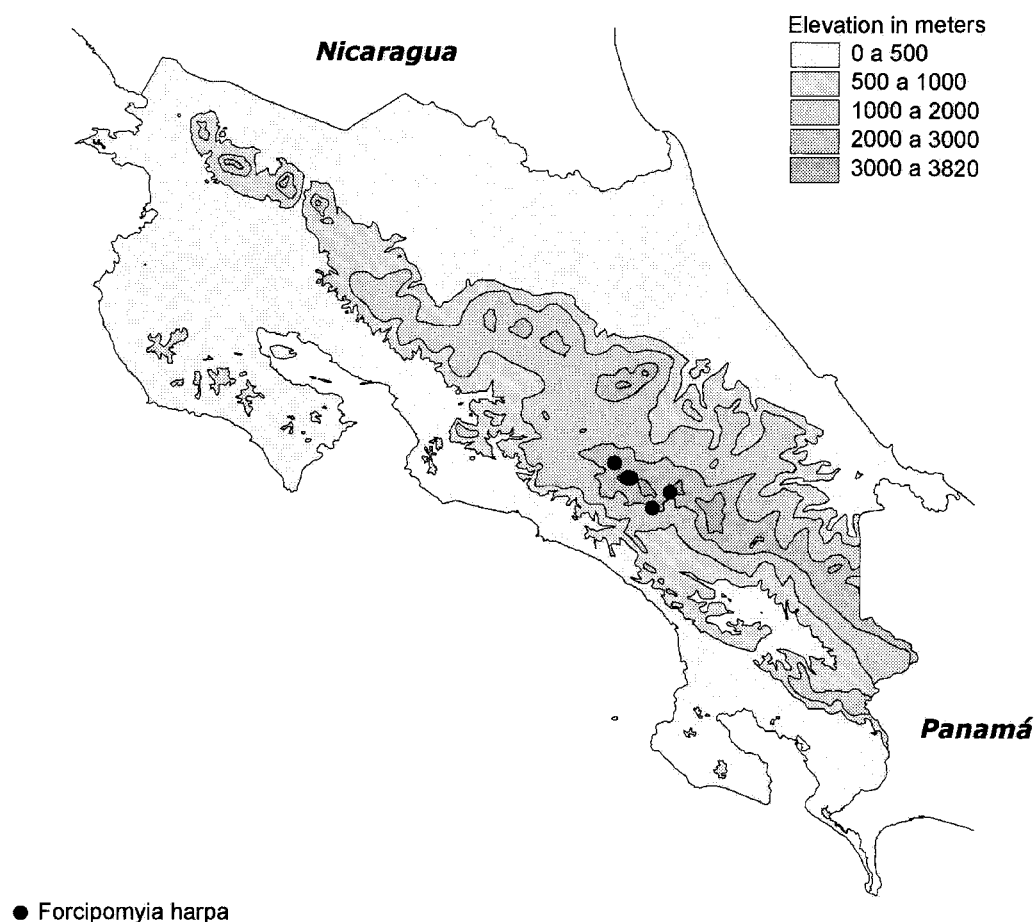
Description of male.— Similar to female with usual sexual differences. Shape of palpus similar to female. Wing length 1.54 (1.40–1.72, n = 10) mm; breadth 0.47 (0.43–0.51, n = 10) mm; CR 0.42 (0.40–0.44, n = 10); scales along the costa and radial veins with 2–4 striae, those of the posterior portion of the wing with only one. Hind tarsal ratio 1.04 (1.00–1.12, n = 10); tarsal claws sharply pointed, tapering to a simple point. Genitalia (Fig. 1) dark brown: tergite 9 short, broad distally; apicolateral process short, with single long, subapical seta; cercus small, just ventral to apicolateral process, with 3–4 setae; segment 9 tapered anteriorly, 0.6 as long as posterior breadth; sternite 9 with shallow, irregular posteromedial excavation. Gonocoxite stout, length 1.5 X greatest breadth, anteromesal angle lightly sclerotized; gonostylus yellowish, slightly sinuate, tapering abruptly to pointed tip. Parameres fused medially, inverted U-shaped, each arm swollen subapically, with mesally directed, recurved, pointed tip. Aedeagus (Fig. 2) heavily sclerotized, as long as basal breadth; basal arms deeply curved; basal arch extending to 0.50 of total length; posteromedial projection (Fig. 3) slender, apex with two pairs of small, pointed teeth.

Female.— Head. Dark brown. Eyes bare, contiguous by distance equal to diameter of 4–5 ommatidia. Flagellum (Fig. 4) brown, bases of flagellomeres slightly darker; flagellomeres 3–8 with distal portion elongate, 9–13 subcylindrical; AR 0.64 (0.62–0.67, n = 8). Mouthparts short. Mandible, laciniae reduced, without teeth. Palpus (Fig. 5) brown; third segment swollen on basal 3/4, with deep pit opened by small round mesal pore; fourth segment broadly connected with fifth; PR 1.85 (1.65–2.00, n = 9). Thorax. Uniformly dark brown. Legs dark brown with abundant flattened scales, knees pale; tibiae (Fig. 6) with broad subbasal pale band, hind tibia with apical pale band; tarsi with narrow pale rings at joints, tarsomere 5 pale; hind tarsal ratio 1.10 (1.08–1.18, n = 9); hind tibial comb with seven spines; spur short, pointed with proximal spicules. Wing (Fig. 7), length 1.40 (1.24–1.60, n = 9) mm; breadth 0.56 (0.51–0.62, n = 9) mm; CR 0.46 (0.43–0.49, n = 9); membrane infuscated, venation as figured; macrotrichia lost in examined specimens, more abundant along anterior margin of wing, over radial cells, and in broad band across mid-portion of cell r3, to lesser extent along posterior veins (based on distribution of sockets). Halter brown. Abdomen. Dark brown, with abundant narrow, elongate scales. Separate sclerite at posterior margin of sternite 8 (Fig. 8) transverse, spiculate, constricted mesally with broader bluntly rounded apices; sternite 9 with short anterior projections; sternite 10 with one pair of apical setae. Two ovoid, subequal spermathecae with short necks (Fig. 9), each measuring 63 (60–70, n = 6) by 52 (50–55, n = 6)  $\mu\text{m}$ , neck 7 (6–8, n = 6)  $\mu\text{m}$ .



**FIGURES 1–11.** 1–9 Structures of *Forcipomyia harpa*; 10–11, structures of *F. cinctipes*; 1–3, 11, male; 4–10, female. 1, Genitalia (aedeagus not shown); 2, aedeagus; 3, posteromedial projection of aedeagus; 4, flagellum; 5, 11, right palpus; 6, femora and tibiae (left to right: fore, mid, hind); 7, wing; 8, 10, apex of abdomen. (scl. = sclerite; st. 9 = sternite 9; st. 10 = sternite 10).

Distribution. This species is known from five localities in the Talamanca Mountains of Costa Rica (Fig. 12) and has been collected from 2000–3000 meters. The lower altitude was recorded from specimens at Madreselva, as 2000–2600 meters and, if collected at an upper elevation from this locality, *F. harpa* may actually be restricted to an altitude of 2250–3000 meters.



**FIGURE 12.** Distribution of *Forcipomyia harpa*.

**Bionomic Information.**— This species is recorded from very wet cloud forest and sub-paramo habitats. Males from 15 km N. San Isidro were collected at an incandescent light at “Avalon Reserva Privada”, located in oak cloud forest. All other specimens were taken with Malaise traps.

**Taxonomic Discussion.** Males of *F. harpa* differs from those of the only other New World species in the subgenus, *F. (S.) cincipes* (Wirth, 1990), in having a palpus with a large basal swelling, a more squat gonocoxite, subapically swollen parameres which then taper to a thin point, and an aedeagus bearing a long, slender posteromedial projection

with two pairs of small, apical pointed teeth. Females of *F. harpa* are distinguished from those of *F. cinctipes* in having flagellomeres 3–8 with a longer slender apical section, sternite 9 with short anterior projections and sternite 10 with only one pair of setae (Figs. 8, 10).

Wirth (1990) mentioned that the male palpus of *F. cinctipes* was more slender than that of the female and we have provided a figure of the male palpus of this species (Fig. 11). It is significantly more slender than that of the male of *F. harpa*, which is similar to that of the female (Fig. 5) of our new species.

The male and female of this species were associated by their shared pigmentation patterns and were collected together at three localities: at the type locality, 4 km E Villa Mills and at Madreselva.

Types. Holotype ♂, Costa Rica, 15 km N. San Isidro, 2250 m, 13–14-III-1999, A. Borkent, CD5002 (CNCI); allotype ♀, Costa Rica, 15 km N. San Isidro, 2250 m, 11–12-III-1999, A. Borkent, CD5001 (CNCI). Paratypes 17 ♂, 8 ♀, all from Costa Rica as follows: same data as holotype, 5 ♂ (CNCI); same data as allotype, 3 ♂ (CNCI); Cartago, Reserva Forestal Rio Macho, Est. Ojo de Agua, 3000 m, 27-V–27-VI-1997, B. Gamboa, LS-396500N/482050E, #51977, CD5005, 1 ♂ (INBC); Cartago, Reserva Forestal Rio Macho, Est. Ojo de Agua, 3000 m, 28-III–7-IV-1997, B. Gamboa, LS-396500N/482050E, #51976, CD5006, 1 ♂ (INBC); Cartago, Reserva Forestal Rio Macho, Est. Ojo de Agua, 3000 m, Trampa Malaise, 22/28-VII-1999, A. Picado, LS 396400/483500, #52878, CD5105, 4 ♀ (2, INBC; 1, CNCI; 1, MLPA); San Jose, Reserva Forestal Rio Macho, Est. Ojo de Agua, 3000 m, 13–25-I-1997, B. Gamboa, M. Segura, LS 396500/482050E, #45680, CD5009, 1 ♂ (MLPL); San José, 4 km E Villa Mills, 2900 m, 26-IX/29-XI-1996, A. Picado-B. Gamboa, LS 390450/500100E, #44767, CD5012, 3 ♂, 2 ♀ (3♂, 1♀, INBC; 1♀, CNCI); Madreselva, Foa Los Lagos, Prov. San José, 2000–2600 m, IX/X-1995, M.M. Chavarria, LN 184450 550050, # 6889, CD5046, 3 ♂, 2 ♀ (2 ♂, 1 ♀, INBC; 1♂, 1♀, MLPA).

Derivation of specific epithet. The name *harpa* (Greek, = sickle) refers to the harpoon-like posteromedial projections on the apex of the aedeagus.

## Discussion

Wirth (1990) provided a key which allows for the recognition of *F.* (*Schizoforcipomyia*). In his couplet 2, leading to *F.* (*Schizoforcipomyia*) and *F.* (*Lepidohelea*), the palpus is described as “with third segment more or less spindle-shaped, slightly more swollen on basal half with sensory pit located at about 1/3 length”. In fact, both New World species of *F.* (*Schizoforcipomyia*) have the female third palpal segment swollen for the basal 3/4 and have the pit located about mid length. The palpus of *F. harpa*, for example, is virtually identical to that of *F.* (*Forcipomyia*) *taragui* (Marino & Spinelli, 1999; as *F. guarani*). Therefore, this character does not serve to separate these two subgenera from *F.* (*Forcipomyia*).

There were two female specimens of *F. (Schizoforcipomyia)* which we initially believed to be conspecific with *F. harpa*. One, from the type locality 15 km N. San Isidro, 13–14-III-1999, had a unicolorous midtibia and broader scales on the abdomen, at least on sternites 5–7 (the specimen was missing many of its scales). The other, from Reserva Biológica Hitoy Cerere (Sendero Toma de Agua), 100 m, 17-IV/18-V-1999, was significantly smaller than all other specimens (with a wing length of 0.80, compared to 1.24–1.60 for *F. harpa*) and had a slightly differently-shaped palpal segment 3. It was also the only specimen collected below 2000 meters. These two specimens may be variants of the *F. harpa* but we suspect that they actually represent further undescribed species of *F. (Schizoforcipomyia)*.

Worldwide, all species of *F. (Schizoforcipomyia)* (Table 1) are known as males, nine of the 13 are known as females and the larvae and pupae have been described for two (Chan & LeRoux, 1971; Krivosheina, 1968).

**TABLE 1.** World species of *Forcipomyia (Schizoforcipomyia)* with type-locality and stages known for each.

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<i>anna</i>	de Meillon, 1959: 331. South Africa. ♂
<i>borbonica</i>	Clastrier, 1959: 436. Réunion (France). ♂, ♀. pupa, larva
<i>penniornata</i>	Tokunaga and Murachi, 1959: 163. Guam (USA).
<i>fuscimaculata</i>	Hardy, 1960: 170. USA (Hawaii).
<i>stabilis</i>	Sen and Das Gupta, 1968: 95. India.
<i>petersoni</i>	Chan and LeRoux, 1971: 272. Singapore.
<i>chazeaui</i>	Clastrier and Delécolle, 1991: 222. New Caledonia (France). ♂, ♀
<i>cinctipes</i>	(Coquillett), 1905: 64 ( <i>Ceratopogon</i> ). USA (Florida). ♂, ♀
<i>clavula</i>	Debenham, 1987: 639. Australia (New South Wales). ♂
<i>harpa</i>	Spinelli and Borkent, this paper. Costa Rica. ♂, ♀
<i>lecordeurorum</i>	de Meillon, Meiswinkel and Wirth, 1982: 132. South Africa. ♂
<i>lydiae</i>	Clastrier and Delécolle, 1991: 219. New Caledonia (France). ♂, ♀
<i>monoceros</i>	Debenham, 1987: 634. Australia (New South Wales). ♂, ♀
<i>rudebecki</i>	de Meillon, 1959: 330. South Africa. ♂
<i>tinia</i>	Krivosheina, 1968: 583. Russia. ♂, ♀, pupa, larva
<i>warreni</i>	de Meillon and Wirth, 1981: 528. South Africa. ♂, ♀
<i>yirkkala</i>	Debenham, 1987: 636. Australia (Northern Territory). ♂, ♀

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