

Description of *Lutzomyia (Trichophoromyia) nautaensis* n. sp. (Diptera: Psychodidae) from the Peruvian Amazon Basin

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ABSTRACT A new species of sand fly, which we describe as *Lutzomyia (Trichophoromyia) nautaensis* n. sp., was collected in the northern Peruvian Amazon Basin. In this region of Peru, cutaneous leishmaniasis is transmitted primarily by anthropophilic sand flies; however, zoophilic sand flies of the subgenus *Trichophoromyia* may also be incriminated in disease transmission. Detection of *Leishmania* spp. in *Lutzomyia auraensis* Mangabeira captured in the southern Peruvian Amazon indicates the potential of this and other zoophilic sand flies for human disease transmission, particularly in areas undergoing urban development. Herein, we describe *Lutzomyia (Trichophoromyia) nautaensis* n. sp., and report new records of sand flies in Peru.

KEY WORDS *Lutzomyia (Trichophoromyia) nautaensis* n. sp., phlebotomine sand fly, new species, Loreto, Peru

The presence of the subgenus *Trichophoromyia* Barretto 1962, was reported for the first time in the Amazon Region of Peru by Llanos 1966 (1964), with the description of *Lutzomyia loretonensis*, *Lutzomyia acostai*, and *Lutzomyia incasica*. Young and Duncan (1994), described three species of this subgenus from Peru and further indicated the presence of seven species from the 35 recognized species in of the South America. About 15 species of *L. (Trichophoromyia)* are presently known in Peru, including *Lutzomyia pastazaensis* Fernández, Carbajal, Alexander & Need, 1993 and *Lutzomyia arevaloi* (Galati & Cáceres, 1999) (WRBU 2015).

The new species described herein was discovered during an arbovirus ecology investigation along the Iquitos-Nauta Highway, in the department of Loreto (Janoviak et al. 2005). This species appears to belong to the subgenus *Trichophoromyia* Barretto (1962), whose members are widely distributed in the Amazon Basin. *L. loretonensis* (Llanos 1964), a closely related species also in the subgenus *Trichophoromyia*, was also collected in this study; therefore, some females could not be identified to species. In this study, we also report the presence of three other new species, *Lutzomyia (Trichophoromyia)* sp. 1, collected in the Napo River Basin (Loreto), *Lutzomyia (Trichophoromyia)* sp. 2, collected close to Aguaytia (Ucayali), and *Lutzomyia (Trichophoromyia)* sp. 3, collected in Tahuania (Ucayali). Additionally, we also document three new species

records of *Trichophoromyia* from Peru, *Lutzomyia cellulana* Young 1979, collected in the Pastaza River basin (Loreto), *Lutzomyia saltuosa* Young 1979, collected in the Napo River basin (Loreto), and *Lutzomyia velascoi* Le Pont & Desjeux, 1992, collected in the jungle of the department of Puno.

The structural terminology, generally, follows Mc Alpine (1981), but with some exceptions adapted and commonly used in sand fly studies (Young and Duncan 1994). All measurements in text are given in millimeters; the range of measurements indicated in parenthesis includes the holotype and six male paratypes. Taxonomic classification follows the descriptions by Young and Duncan (1994).

Nomenclature

This paper and the nomenclatural act it contains have been registered in Zoobank (www.zoobank.com), the official register of the International Commission on Zoological Nomenclature. The LSID (Life Science Identifier) number is: urn:lsid:zoobank.org:pub:4C26F0F5-7E5B-4B09-8168-77D8E438D8C7.

Lutzomyia (Trichophoromyia) nautaensis n. sp. Fernandez, Lopez, Roldan & Requena (Figs. 1–8).

Holotype ♂. Medium size, dark brown, with pleura more pigmented than mesonotum, sternopleura, coxites, and dorsal abdomen.

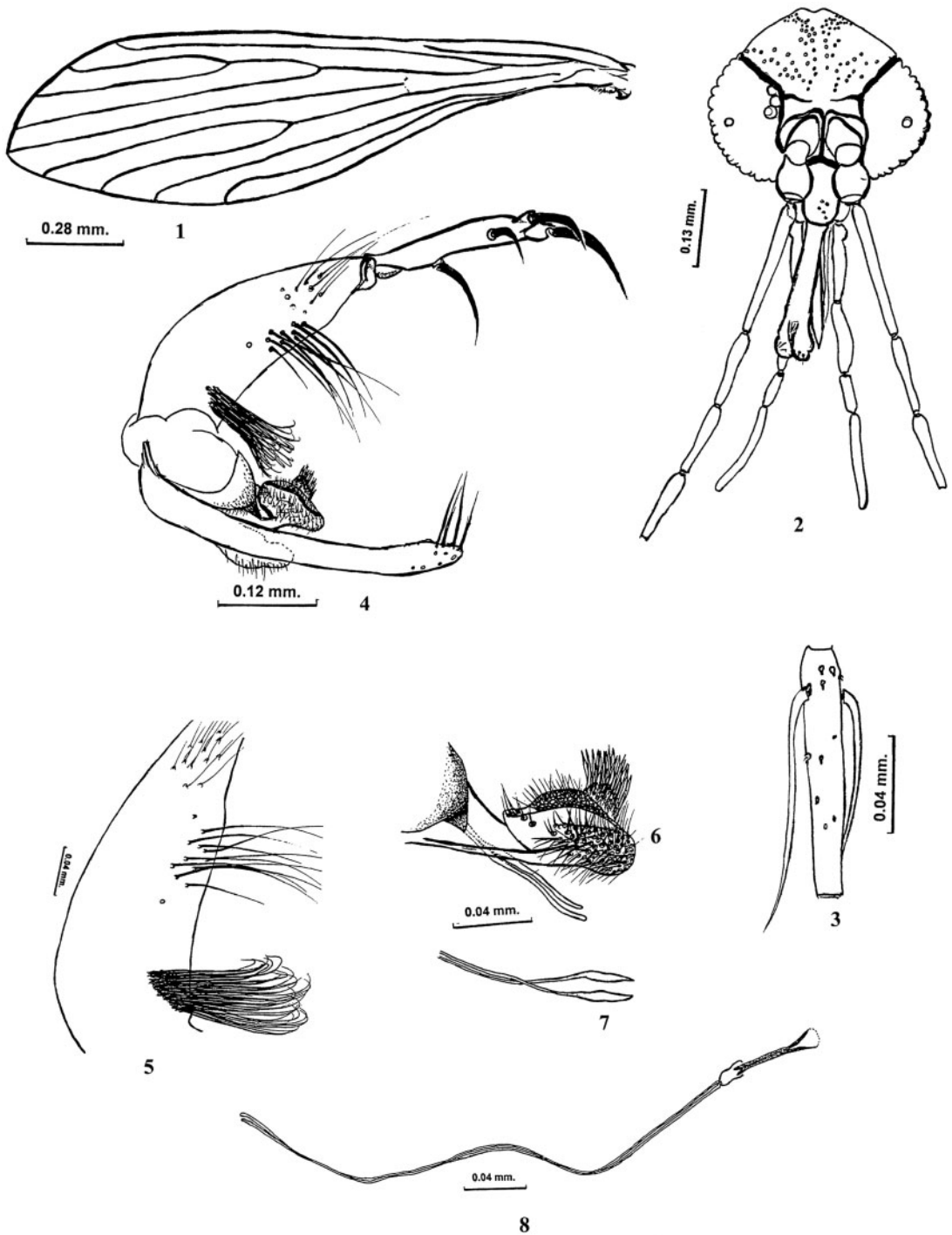
Head length from base of clypeus to vertex 0.24 mm (0.24–0.27) and width 0.34 mm (0.33–0.34) broad. Eyes large, high 0.20 mm (0.19–0.21), separated by maximum distance of 0.26 mm (0.25–0.26) at top margin of eyes and by minimum of 0.12 mm (0.12–0.12) at

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Figs. 1–8. *Lutzomyia nautaensis*, n. sp., holotype male: (1) wing, (2) head, (3) flagellomere IV, (4) genitalia, lateral view, (5) coxite, (6) paramere, (7) tips of filaments, and (8) genital pump and filaments.

interocular suture level. Length of flagellomeres I–IV 0.22 mm (0.20–0.23), 0.12 mm (0.12–0.13), 0.12 mm (0.12–0.13), and 0.12 mm (0.12–0.13), respectively; ascoids long, simple, arising from fifth basal flagellomere and extending past length of this segment,

and bearing short barely discernible spurs, and are presents on flagellomeres II–XII. Length of palpomeres 1 = 0.03 mm (0.02–0.03), 2 = 0.09 mm (0.08–0.09), 3 = 0.12 mm (0.10–0.13), 4 = 0.06 mm (0.05–0.07), and 5 = 0.15 mm (0.13–0.15), palpal

formula 1:4:3:2:5. Newstead's sensillae in distal two-thirds of palpomere 3. Cibarium unarmed; arch not conspicuous, pigment patch not visible. Labrum length 0.20 mm (0.19–0.22); pharynx length 0.15 mm (0.15–0.17), unarmed.

Thorax: pleura with 12–14 upper and 3–4 lower episternal setae. Wing length 1.81 mm (1.75–1.85); width 0.50 mm (0.49–0.53). Measurements of the wing veins: alpha 0.47 mm (0.46–0.57), beta 0.26 mm (0.23–0.29), gamma 0.22 mm (0.20–0.25), and delta 0.31 mm (0.27–0.33). Femora, tibiae, and basitarsi length: foreleg 0.76 mm (0.74–0.78), 1.02 mm (0.94–1.03), and 0.61 mm (0.57–0.62); midleg 0.71 mm (0.70–0.74), 1.20 mm (1.16–1.23), and 0.70 mm (0.68–0.72); and hindleg 0.78 mm (0.78–0.80), 1.40 mm (1.35–1.46), and 0.77 mm (0.78–0.82), respectively.

Abdomen: Male genitalia. Coxite length 0.36 mm (0.33–0.39), gently curved and bearing two groups of setae, one of them at base of coxite, directly implanted on surface and bearing compact group of thin and apical curved bristles; second tuft is above apical half, spread out and formed by 10–12 straight bristles. Style length 0.23 mm (0.22–0.24), with four strong-spines, one of these isolated and remaining three positioned at different levels in its distal third. No subterminal seta. Paramere simple, long, and ending in typical rectangular shape with three levels of bristles, ventro-apical ones with numerous setae implanted in short boils; the dorsal-basal ones bearing fine setae projecting toward the front, and dorsal-superior ones with numerous strong setae, leaflets shaped, equally implanted in short visible boils. Aedeagus short and broad. Genital pump 0.20 mm (0.18–0.20) in length, each filament 1.0 mm (0.87–1.06) in length or five times the length of the pump; filament tips slightly expanded and acute. Lateral lobe 0.41 mm (0.40–0.45) in length.

Material Examined. The type locality is situated south of Iquitos, at kilometer marker 62.5 km of the Iquitos-Nauta Highway (04° 25'568" S; 73° 50'453" W), in San Juan District, Maynas Province, Loreto Department and at 105 m above sea level. The vegetation in this locality is typical of a secondary forest and belongs to the life zone known as a very humid Tropical forest (bmh-T) according to the Oficina Nacional de Evaluacion de Recursos Naturales (ONERN 1976).

The holotype (NAMRU-6 accession no. 4793) and paratypes were collected with dry ice-baited miniature CDC light trap by E. R. on 08 April 2003. Other paratypes were collected with a Shannon trap and dry ice-baited miniature CDC light traps: 2 ♂♂ on 23 January 2003, 7 ♂♂ on 11–12 July 2003, 5 ♂♂ on 30 March 2004, and 2 ♂♂ on 27 April 2004. The holotype and the paratypes were mounted in Euparal and will be deposited in the sand fly collection at the Entomology Department of the U.S. Naval Medical Research Unit No. 6 (NAMRU-6) Lima, Peru.

Etymology. The new species is named *Lutzomyia (Trichophoromyia) nautaensis* n. sp. in homage to Nauta, a village located at the origin of the Amazon River.

Remarks. *Lutzomyia nautaensis* n. sp. appears to belong to the subgenus *Trichophoromyia* Barretto, 1962, for which 13 other species have been reported from Peru (Young and Duncan 1994, Fernández et al. 1993, Galati and Cáceres 1999, WRBU 2015).

Lutzomyia nautaensis n. sp. differentiates from other *Trichophoromyia* species by the characteristics of two coxite tufts of equally long bristles, one of them basal implanted directly on the surface, compact and with many apically curved bristles; the other one has straight and spread out bristles located at the base of the apical half.

Lutzomyia nautaensis n. sp. also differentiates by the typical morphology of the paramere, which is unique and very different from the other species within the subgenus.

Lutzomyia nautaensis n. sp. has been collected together with *L. loretonensis*, thus females were not described as they are very similar between species.

Lutzomyia cellulana Young, 1979, *L. saltuosa* Young, 1979, and *L. velascoi* Le Pont & Desjeux, 1992, are recorded for the first time in Peru.

We also report three new species that belong to the subgenus *Trichophoromyia* and that we informally refer to as *Lutzomyia (Trichophoromyia)* sp. 1, from Loreto; *Lutzomyia (Trichophoromyia)* sp. 2, from Aguaytia (Ucayali); and *Lutzomyia (Trichophoromyia)* sp. 3, from Tahuania (Ucayali).

Finally, we updated the record of *Trichophoromyia* species present in Peru; we have recorded 17 species, which are generally distributed in the Amazon Basin.

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