

SCIENTIFIC NOTE

BILATERAL ANOMALY IN *EVANDROMYIA EVANDROI* (DIPTERA: PSYCHODIDAE: PHLEBOTOMINAE) CAPTURED IN VICÊNCIA MUNICIPALITY, NORTHERN RAINFOREST REGION OF PERNAMBUCO STATE, BRAZIL

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ABSTRACT. Approximately 800 species of phlebotomine sand flies, many of which are vectors of *Leishmania*, have been described. Besides morphological similarities within groups, the occurrence of anomalies within a species may lead to an erroneous description of new species. This paper describes one phlebotomine sand fly, *Evandromyia evandroi*, with a symmetrical bilateral anomaly in the number of spines on the gonostyle. In this specimen, the anomalous spine is located in the external region of gonostyle, inserted between the upper external and the lower external spines. It is important to document morphological anomalies, so as to avoid erroneous sand fly identifications.

KEY WORDS Sand fly, gonostyle, identification

Phlebotomine sand flies have been associated with the transmission of bacterial, viral, and protozoal diseases. Their classification is complex, and their identification is primarily based on morphological characters. An erroneous identification and the subsequent description of a new species based on morphological anomalies may lead to the accumulation of synonymous names within a species complex or clade (Cutolo et al. 2009).

The difficulty in identifying these insects is the similarity between some species, which can lead to errors in identification, mistakes in the geographical distribution, and erroneous association between the sexes of some species of sand flies (Andrade Filho et al. 2004).

Morphological anomalies in phlebotomines have been recognized in several specimens from America, Europe, and Africa (Kassem et al. 1988, Marcondes 1999, Florin et al. 2010). These abnormalities could pose a taxonomic problem, as specimens with the abnormalities could be misidentified. Additionally, some anomalies can affect the sexual behavior and the reproduction in some phlebotomine sand flies species (Ximenes et al. 2002).

Evandromyia evandroi (Costa Lima and Antunes) has a very extensive geographical distribution, being found in all 5 Brazilian regions (Andrade Filho et al. 2001a, 2001b; Ximenes et al. 2001; Dias-Lima et al. 2003). The phlebotominae fauna in Vicência municipality, Northern Atlantic Rainforest region in Pernambuco State, has been studied since 2004 (Brandão Filho, unpublished observations). In this note we describe a specimen with 5 spines on the gonostyle from this locality that was provisionally identified as *E. evandroi*.

The phlebotomine sand fly provisionally identified as *E. evandroi* was captured in the locality of “Engenho Imbu,” Vicência municipality, Northern Rainforest region, Pernambuco State, Brazil. The climate in this location is typically that of a tropical rainforest, with an average annual rainfall of 1,200 mm and an average temperature of 25°C. The vegetation is predominantly composed of deciduous and semideciduous forests with small areas of banana and sugar cane plantations.

Collections were made from August 2004 to July 2006 during the first week of each month using the Centers for Disease Control and Prevention light traps, positioned approximately 800 m from a house. The specimens collected were fixed in 70% alcohol and sent to the Laboratory of Phlebotominae Sand Flies Identification in Centro de Pesquisas Aggeu Magalhães/Fundação Oswaldo Cruz (Fiocruz), Recife. The fixed specimens were placed for 3 h in 10% potassium hydroxide, then placed for 20 min in acetic acid, then washed 3 times for 15 min in distilled water, and finally cleared for 24 h in lactophenol and mounted (26 × 76 cm) in Berlese fluid. The mounted specimens were identified

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Table 1. Morphometric comparison (in micrometers) in the anomalous and plesiotype of *Evandromyia evandroi*.

Structure	Anomalous specimen	Plesiotype
Clypeus	165	151
LE	220	216
P1	30	32
P2	140	108
P3	151	146
P4	118	113
P5	336	373
Wing width	549	508
Alfa	381	351
Beta	314	297
Gama	336	248
Delta	56	65
Coxite length	338	329
Coxite width	102	108
Style length	187	162
Lateral lobe length	448	378
Lateral lobe width	36	33
Ejaculatory bomb length	184	189
Genital filaments length	366	302

according to taxonomic criteria proposed by Galati (2003).

The subject specimen of this report was examined and measured under a Olympus CH-2 microscope with a calibrated ocular micrometer. A photograph was obtained through this microscope system with a camera lucida and photographed with Sony Cyber-shot 7.2 megapixels DSC-W80 digital camera. The measurements were recorded in micrometers and compared with those of the plesiotype of *E. evandroi*, deposited in the collection of Phlebotominae of the Centro de Pesquisas Rene Rachou/Fiocruz, Belo Horizonte, Brazil (no. 20.651). The plesiotype is mounted in Canada balsam, with measurements described by Martins et al. (1962).

The morphometric data of the anomalous sand fly and the plesiotype of *E. evandroi* are shown in Table 1. Two important morphological diagnostic features for *Evandromyia evandroi* were observed: The tip of the genital filament is blunt, and there is a conic lobe in the internal face on the paramere. There were no additional morphological differences between the anomalous specimen and the plesiotype of *E. evandroi*. All structures, such as antennomere, palpomeres, genital filaments, ejaculatory pump, lateral lobes, parameres, and aedeagus, were similar to between the anomalous specimen and the plesiotype. The only difference was the gonostyle of the Vicência anomalous sand fly, which had a bilateral anomaly. The spines on the gonostyle in the plesiotype are arranged as follows: one apical, one external upper, one external lower, and one internal. On the anomalous specimen the 5th

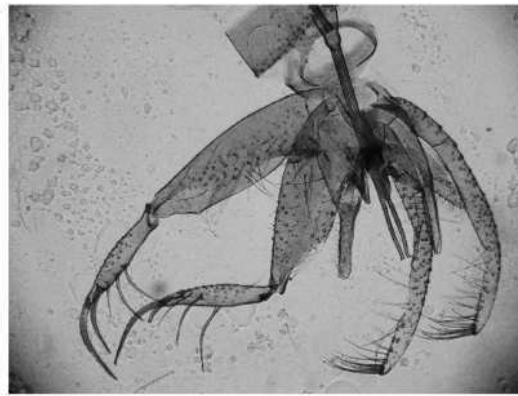


Fig. 1. *Evandromyia evandroi* with anomaly.

spine is situated between the external upper and the external lower (Fig 1).

The percentage of anomalous specimens in Vicência municipality was low. Of 3,321 specimens of *E. evandroi* caught in Vicência municipality 1,442 were males and 1,879 females (unpublished observations). The anomaly rate for *E. evandroi* males was 0.07, corresponding to one specimen.

In general, anomalies can occur in paired structures, such as antennae, palpomeres, spermathecae and in male terminalia, but a correct identification is possible based on corresponding structures (Andrade Filho et al. 2004). Unilateral anomalies or morphological differences have been described in several phlebotominae sand flies species, such as *Lutzomyia neivai* (Pinto) with 3 spermathecae (Taniguchi et al. 1992), *L. intermedia* (Lutz and Neiva) with an anomaly in the gonostyle (Marcondes 1999), *L. longipalpis* (Lutz and Neiva) with anomaly in the paramere (Ximenes et al. 2002), and the genus *Micropygomyia* showing a similar anomaly (sensu Galati 2003).

Bilateral anomaly was described for *L. sordellii* (Shannon and Del Ponte) with 8 spines on the gonostyle and 5 in the other (not symmetrical) (Cutolo et al. 2009). *Lutzomyia schreiberi* (Martins, Falcão and Silva) and *L. shannoni* (Dyar) were reported with symmetrical bilateral anomaly, with 5 spines in each gonostyle, while the normal is 4 spines (Andrade Filho et al. 2004, Florin et al. 2010). Pinto et al. (2010) described symmetrical bilateral anomaly in 14 *L. intermedia* specimens, which usually present 4 spines in the gonostyle, with 3 and 5 spines in this appendix.

The selective advantage, disadvantage, or neutrality of a morphological anomaly is difficult to discern (Ximenes et al. 2001, Andrade Filho et al. 2004). However, documenting these anomalies is important for taxonomic purposes. Anomalies are caused by a mutation that results in an aberrant morphology. The presence of lower or higher percentages of anomalies in different

populations of the same species from different geographical regions may reflect environmental pressures induced by natural causes or human activities.

We are grateful to CNPq, FACEPE, and FIOCRUZ for funding support.

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