

# Taxonomic revision of the mydas-fly genus *Plyomydas* Wilcox & Papavero, 1971 (Insecta: Diptera)

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## Introduction

Mydidae, a fly family with some 573 species world-wide, display short periods of annual activity and limited geographical distributions, thus contributing to their scarcity in insect collections<sup>1</sup> and the lack of extensive taxonomic study.

The mydas-fly genus *Plyomydas* Wilcox & Papavero, 1971 was described from a single species, *P. peruviansis* Wilcox & Papavero, 1971, occurring in the coastal region of the Peruvian Andes (Fig. 1b) and has not been studied further since. New material of this genus has been discovered in several natural history collections that extend the distribution of *Plyomydas* to the eastern Argentinean Andes and Paraguay. Flies of *Plyomydas* are relatively large with a wing length between 10–19 mm and *P. peruviansis* is smaller than the Argentinean and Paraguayan species. The expansion of this genus across the Andean mountains indicates that there may be additional species within *Plyomydas* that have not been collected.

We conducted a morphological taxonomic revision of the known species *P. peruviansis* and describe two new species. Light microscopy, macrophotography, and digital illustrations were used to compile an extensive list of characters to generate diagnostic characters for species identification and a dichotomous key.



Fig. 1. *Plyomydas* fly and distribution: (a) whole habitus lateral; (b) map of South America

## Materials

Thirty specimens originating from 11 natural history collections were examined in this study. USNM—National Museum of Natural History; AMNH—American Museum of Natural History; CAS—California Academy of Sciences; CSCA—California State Collection of Arthropods; MUSM—Universidad Nacional Mayor de San Marcos, Museo de Historia Natural, Lima; CNC—Canadian National Collection of Insects; IMLA—Instituto Fundación Miguel Lillo, Tucumán; ZSMC—Zoologische Staatssammlung, Munich; SMNS—Staatliches Museum für Naturkunde, Stuttgart; MNHN—Muséum National d'Histoire Naturelle, Paris; MZSP—Museu de Zoologia da Universidade de São Paulo.

## Methods

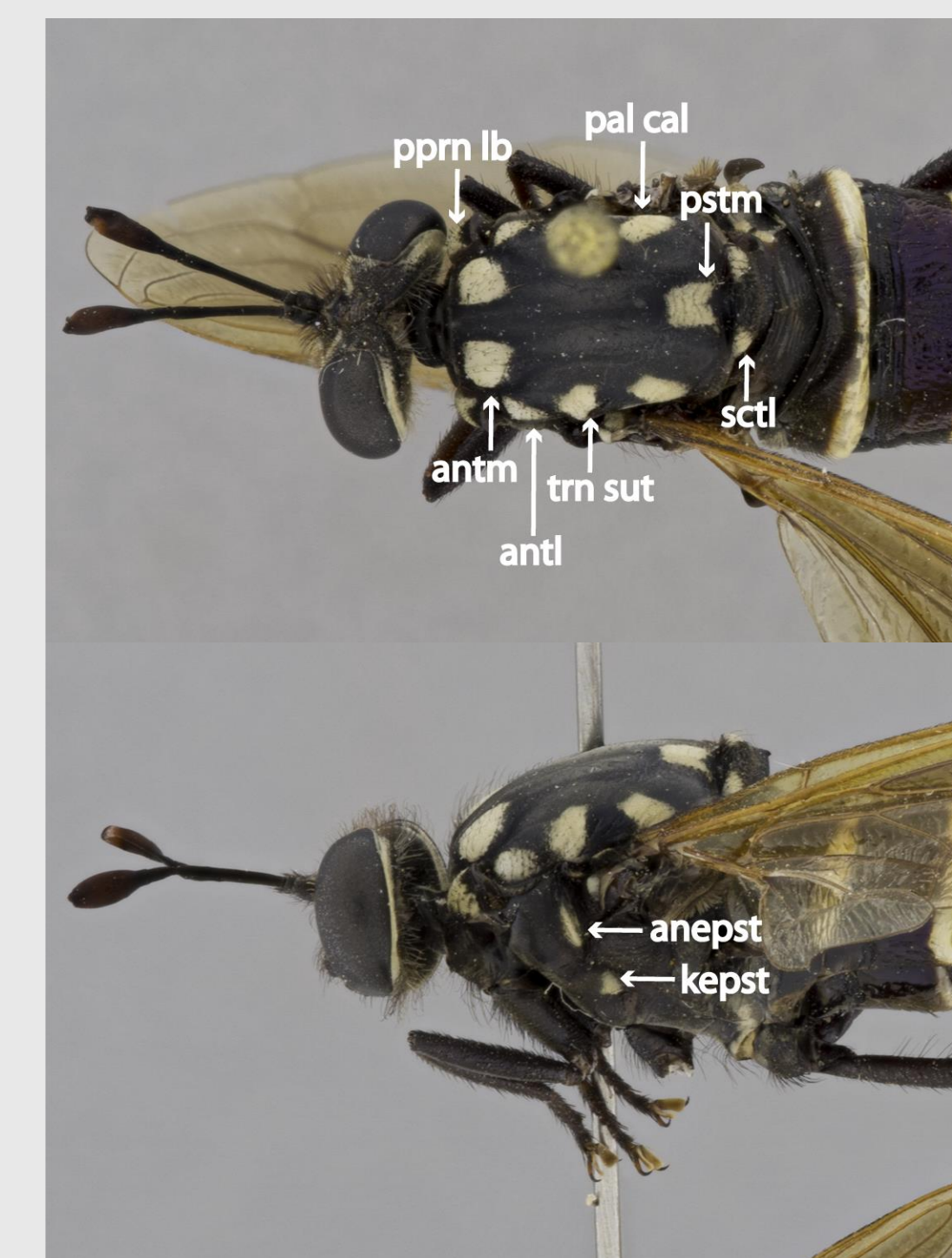
A standard set of whole habitus photographs were taken using a Visionary Digital Passport II system (base and StackShot), an Olympus digital Micro 4/3 camera, a 60 mm macro lens, and a Falcon FLDM-i200 LED dome-light. RAW images were stacked using HeliconFocus Pro software. Species occurrence data were plotted in SimpleMapp. Morphological features were examined and illustrated using an Olympus SZ60 stereo microscope with an ocular grid and digitally re-drawn with Adobe Illustrator. Lucid Builder was used to construct a character matrix of 153 characters, which were then exported into natural-language species descriptions.

## Distinct Pubescence Patterns



### *Plyomydas peruviansis*

- Densely pubescent postpronotal lobe (pprn lb).
- Scutum predominantly grey pubescent, apubescent paramedian (parm) stripes and apubescent median (m) stripe that does not reach posterior margin.
- Scutellum (sctl) with densely grey pubescent spots antero-laterally.
- Anepisternum (anepst) with posterior pubescent stripe.



### *Plyomydas sp. nov. 1*

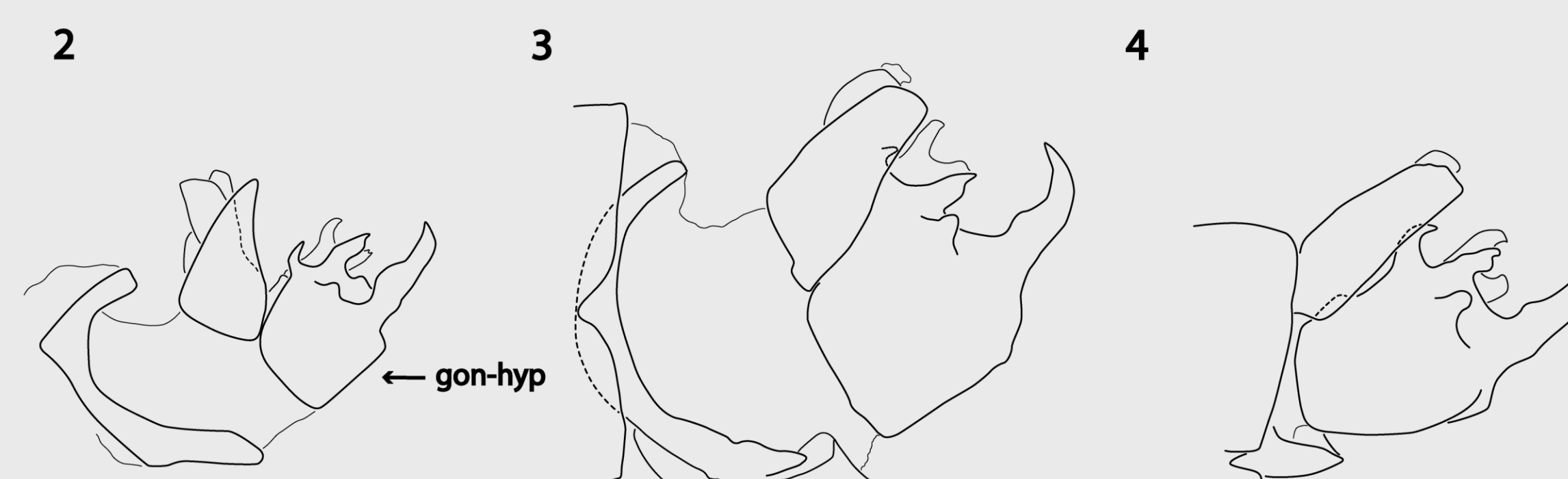
- Densely pubescent postpronotal lobe (pprn lb).
- Scutum with 1 postero-medial (pstm) & 4 pairs of pubescent spots: 1 antero-medial (antrn), 1 antero-lateral (antl), 1 lateral (trn sut), & 1 posterior at postalar callus (pal cal).
- Scutellum (sctl) with pubescent spots antero-laterally.
- Anepisternum (anepst) with posterior pubescent stripe.
- Katepisternum (kepst) with dorsal pubescent spot.



### *Plyomydas sp. nov. 2*

- Scutum with 3 pairs of densely pubescent spots: 1 antero-medial (am), 1 lateral at transverse suture (trn sut), & 1 posterior at postalar callus (pal cal).
- Katepisternum (kepst) with dorsal pubescent spot.

## Conserved Male Terminalia



Figs 2-4. ♂ terminalia of *Plyomydas* species in lateral view: (2) *P. peruviansis*; (3) *P. sp. nov. 1*; (4) *P. sp. nov. 2*.

All three species demonstrate an entirely sclerotized hypandrium, fused with the gonocoxite to form a gonocoxite-hypandrial complex (gon-hyp). Although terminalia structures vary in size and shape, there is little interspecific variation (Figs 2-4).

## Subfamily Transfer



Figs 5-8. ♀ terminalia & wing: (5–6) *P. sp. nov. 2*; (7–8) *Pseudonomonuera micheneri*.

In *Plyomydas*, all Mydinae, and several other Mydidae genera vein  $M_3+M_4$  reaches the costal vein (C, Fig. 5). In Leptomydinae vein  $M_3+M_4$  is reduced (Fig. 7).

The female terminalia of *Plyomydas* lack acanthophorite spines found in Leptomydinae, and most other Mydidae, for oviposition in sand. Instead, they are simple as in the New World Mydinae, which either oviposit in wood or ant nests.

## Discussion

Using modern cybertaxonomic tools we were able to generate an extensive list of characters to aid in a comprehensive species description of *Plyomydas*. We determined that the genus needs to be placed in the Mydinae and not Leptomydinae due to the presence of the  $M_3+M_4$  vein that reaches the costal vein and the female terminalia which lack the acanthophorite spines found in Leptomydinae for oviposition in sand. Instead, they are simple as in New World Mydinae, which either oviposit in wood or ant nests. Additionally, the 14 available museum specimens collected in Peru represent *P. peruviansis*, while the sixteen specimens collected in Argentina and Paraguay represent two new species: *P. sp. nov. 1* distributed in the Salta and Catamarca provinces and *P. sp. nov. 2* in La Rioja and Mendoza provinces. However, since there is one outlying record of *Plyomydas* from Paraguay, more specimens are required to confirm that there are populations of *P. sp. nov. 1* in Paraguay.

Although the male terminalia may often be reliable for inferring phylogeny and in taxonomy delimiting species boundaries, it has been found to be conserved with little interspecific variation in some Mydidae, including *Plyomydas*. The pubescence pattern on the thorax appear to be more reliable for species delimitation in *Plyomydas*. We can confidently ascertain that we have discovered new species and that this genus is more widespread than previously known. Our morphological taxonomic revision will provide an accessible dichotomous key, images, and occurrence data as references for species identification.

## Acknowledgements

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## Literature Cited

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<sup>2</sup>Wilcox, J. and Papavero, N. 1971. The American genera of Mydidae (diptera), with the description of three new genera and two new species. *Arquivos De Zoologia*, 21(2), 41.