



## Integrated taxonomy of a new species of black fly in the subgenus *Trichodagnia* (Diptera: Simuliidae) from the Páramo Region of Colombia

SOFIA A. DIAZ<sup>1</sup>, LIGIA I. MONCADA<sup>1,4</sup>, CARLOS H. MURCIA<sup>1</sup>, INGRID A. LOTTA<sup>2</sup>,  
NUBIA E. MATTA<sup>2</sup> & PETER H. ADLER<sup>3,4</sup>

<sup>1</sup>Department of Public Health, Medicine Faculty, Universidad Nacional de Colombia, Bogotá, Colombia.

E-mail: [limoncadaa@unal.edu.co](mailto:limoncadaa@unal.edu.co), [asdiazs@unal.edu.co](mailto:asdiazs@unal.edu.co)

<sup>2</sup>Department of Biology, Science Faculty, Universidad Nacional de Colombia, Bogotá, Colombia.

<sup>3</sup>School of Agricultural, Forest & Environmental Sciences, Clemson University, Clemson, SC 29634-0310 USA.

E-mail: [padler@clemson.edu](mailto:padler@clemson.edu)

<sup>4</sup>Corresponding author

### Abstract

A new species of simuliid from the Andean Mountains of Colombia is described on the basis of females, males, pupae, larvae, polytene chromosomes, and COI and ITS2 DNA sequences. *Simulium* (*Trichodagnia*) *chinguazaense* **new species** is structurally, chromosomally, and molecularly distinct from its nearest relatives, *S. muiscorum* Bueno, Moncada & Muñoz de Hoyos and *S. sumapazense* Coscarón & Py-Daniel.

**Key words:** Andes Mountains, new species, páramo, polytene chromosomes, *Simulium*

### Introduction

The discovery of biodiversity in the family Simuliidae has been facilitated over the past 50 years by the opportunity to use both structural and chromosomal characters (Adler 2009). The past 15 years have seen increased use of molecular characters as a means of revealing species, especially cryptic species, of black flies (e.g., Hamada *et al.* 2010, Hernández-Triana 2011, Pramual *et al.* 2011, Hernández-Triana *et al.* 2012). Contemporary taxonomy of the Simuliidae now has the nearly unprecedented opportunity to combine characters from morphology, polytene chromosomes, and DNA sequences (Post *et al.* 2003, Ilmonen *et al.* 2009, Pramual & Kuvangkadilok 2012). The routine integration of all three character sources in the discovery and formal description of new species of simuliids, however, has been slow to develop, although a combination of two character sources has been used (e.g., Adler & Kim 1985, Krüger *et al.* 1998, Hamada *et al.* 2010).

We use anatomical structure, polytene chromosomes, and DNA sequences to test the hypothesis of a new species in the *Simulium orbitale* species group of the subgenus *Trichodagnia* from Chingaza Natural National Park in the páramo (alpine tundra) region of Colombia's Andes Mountains. The subgenus *Trichodagnia* includes five species groups, of which the *S. orbitale* group consists of 17 nominal species, all found in South America (Hernández-Triana 2011, Adler & Crosskey 2014).

The high Andes Mountains are considered “water factories”; they are strewn with lakes and streams, including the headwaters of some of northern South America's major rivers. The páramo region lies in northwestern South America at elevations of 3000–4800 m above sea level (Van der Hammen & Otero 2007). The páramo is considered an evolutionary hot spot—an archipelago surrounded by Andean forests (Sklenář & Ramsay 2001). The region is home to a wealth of simuliid biodiversity (Mantilla *et al.* 2013) and includes the new species described herein.

Colciencias. We thank the staff of Chingaza Natural National Park, especially Carlos Lora, Paulina Castro Lalinde, Andrés Patiño, and Unidad de Parques Nacionales. We thank C. E. Beard for excellent technical assistance and M. Y. P. Lesmes for assistance with illustrations. The chromosomal work and electron microscopy was conducted while SD was a visiting student in the laboratory of PHA in 2012.

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