



<http://dx.doi.org/10.11646/zootaxa.4032.1.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:CB9720EB-7BB7-4199-A835-A3266B0DDA6B>

## The dorsal chaetotaxy of first instar *Trogolaphysa jataca*, with description of twelve new species of Neotropical *Trogolaphysa* (Hexapoda: Collembola: Paronellidae)

FELIPE N. SOTO-ADAMES<sup>1,2</sup>

<sup>1</sup>Department of Entomology, University of Illinois, 201 Shelford Vivarium, 606 E. Healey St., Champaign, IL 61820, US

<sup>2</sup>Department of Biology, University of Puerto Rico, San Juan, PR 00931, US. E-mail: [fsoto@illinois.edu](mailto:fsoto@illinois.edu)

### Table of contents

Abstract .....	1
Resumen .....	2
Introduction .....	2
Methods .....	3
Results .....	3
Dorsal chaetotaxy of first instar <i>T. jataca</i> and <i>T. paracarpenteri</i> sp. nov. ....	3
Taxonomy .....	7
Genus <i>Trogolaphysa</i> Mills, 1938. ....	7
<i>Trogolaphysa stannardi</i> sp. nov. ....	8
<i>Trogolaphysa dimorphica</i> sp. nov. ....	14
<i>Trogolaphysa laterolineata</i> sp. nov. ....	16
<i>Trogolaphysa marielouiseae</i> sp. nov. ....	19
<i>Trogolaphysa clarencei</i> sp. nov. ....	21
<i>Trogolaphysa entreriosensis</i> sp. nov. ....	23
<i>Trogolaphysa ocellata</i> sp. nov. ....	25
<i>Trogolaphysa balteata</i> sp. nov. ....	27
<i>Trogolaphysa paracarpenteri</i> sp. nov. ....	29
<i>Trogolaphysa palaciosi</i> sp. nov. ....	32
<i>Trogolaphysa octosetosa</i> sp. nov. ....	32
<i>Trogolaphysa relict</i> a (Palacios-Vargas, Ojeda & Christiansen, 1985) ....	35
<i>Trogolaphysa trioculata</i> sp. nov. ....	35
Discussion .....	39
Acknowledgements .....	40
References .....	40

### Abstract

Adult members of tribe Paronellini are characterized by a substantially reduced idiochaetotaxy and as a result chaeta homology determination is often ambiguous. To evaluate previous hypotheses of chaetae homology in adult *Trogolaphysa*, a complete description of the dorsal chaetotaxy of first instar *Trogolaphysa jataca* (Wray, 1953b), supplemented with observations on first instar *Trogolaphysa paracarpenteri* sp. nov., is presented. It is showed that first instar *Trogolaphysa* carries an almost complete set of dorsal chaetae and that the reduction in adult idiochaetotaxy is secondary. In addition, the organization of primary chaetae in *T. jataca* points to a closer relationship with genera in subfamily Entomobryinae than to Orchesellinae. Based on chaetae correspondence between first instar and adult *T. jataca* it is established that the inner median chaetae on adult head corresponds to M1 instead of S1, the mesothorax p3 complex includes chaetae p1-p4, and on the fourth abdominal segment, anterior macrochaeta on column A corresponds to A3, and the secondary bothriotrix corresponds to D3p. In addition, *T. relict*a (Palacios-Vargas, Ojeda & Christiansen, 1985) is re-described based on a paratype, and 12 new species are described: from Mexico, *T. stannardi* sp. nov., *T. dimorphica* sp. nov., *T. laterolineata* sp. nov., *T. marielouiseae* sp. nov., *T. clarencei* sp. nov., *T. ocellata* sp. nov., *T. paracarpenteri* sp. nov., *T. palaciosi* sp. nov., *T. octosetosa* sp. nov., and *T. trioculata* sp. nov.; from Jamaica, *T. balteata* sp. nov.; and from Argentina, *T. entreriosensis* sp. nov.

**Key words:** post-embryonic development, diagnostic characters, diagnostic tables, homology criteria, Oaxaca, Guerrero, Veracruz, Chiapas, Yucatan, St. Ann Parish, Entre Rios

## Resumen

La reducción de la idioquetotaxia característica de adultos en la tribu Paronellini es tal que la determinación de homologías de los elementos que persisten es ambigua. Con el propósito de evaluar la homología del remanente idioquetotácico en adultos, se presenta una descripción completa de la quetotaxia dorsal del primer estadio de *Trogolaphysa jataca* (Wray, 1953b), con observaciones de la quetotaxia primaria en *T. paracarpenteri* **sp. nov.** Los resultados demuestran que la reducción en adultos es secundaria pues la quetotaxia primaria de *Trogolaphysa* comprende casi todos los elementos observados en otros Entomobryoidea. Además, la organización de la quetotaxia primaria apunta a una relación más cercana de *Trogolaphysa* a Entomobryinae que a Orchesellinae. La correspondencia quetotácica entre el primer estadio y adulto indican que la seda medio-interna en la cabeza corresponde a M1 en lugar de S1, el complejo p3 en el mesotórax incluye sedas p1-p4, y en el cuarto segmento abdominal la macroseda anterior en la columna A corresponde a A3 mientras que la botriotrica posterior corresponde a la seda secundaria D3p. Complementado la descripción del primer estadio, se redescrive *T. relictata* (Palacios-Vargas, Ojeda & Christiansen, 1985) con base en un paratipo y se describen 12 especies nuevas: de México, *T. stannardi* **sp. nov.**, *T. dimorphica* **sp. nov.**, *T. laterolineata* **sp. nov.**, *T. marieloiseae* **sp. nov.**, *T. clarencei* **sp. nov.**, *T. ocellata* **sp. nov.**, *T. paracarpenteri* **sp. nov.**, *T. palaciosi* **sp. nov.**, *T. octosetosa* **sp. nov.**, y *T. trioculata* **sp. nov.**; de Jamaica, *T. balteata* **sp. nov.**; y de Argentina, *T. entreriosensis* **sp. nov.**

**Palabras claves:** desarrollo post-embrionario, caracteres diagnósticos, tablas diagnósticas, criterios de homología, Oaxaca, Guerrero, Veracruz, Chiapas, Yucatán, St. Ann Parish, Entre Ríos

## Introduction

Recent studies on *Trogolaphysa* (Soto-Adames & Taylor 2013), *Cyphoderopsis* (Jantarit *et al.* 2013) and *Troglopedetes* (Soto-Adames *et al.* 2014) have remarked on the great reduction in idiochaetotaxy (i.e., differentiated chaetae) of members of these genera. Based on the pattern of reduction, Soto-Adames *et al.* (2014) synonymized tribes Troglopedetini and Paronellini, and proposed a new diagnosis for Paronellini based on chaetotaxy. Whether the reduction in chaetotaxy in Paronellini reflects ancestry or convergence is difficult to answer based on studies of the adult chaetotaxy because the loss of many chaetae obliterates points of reference to establish homology between elements. An alternative way of evaluating the origin of the reduced chaetotaxy is by studying first instar individuals, which in most entomobryoids so far described show an almost complete set of chaetae and homologies can be determined with greater confidence than in adults (Szeptycki 1979).

Studies describing the chaetotaxy of first instar entomobryids have used reared individuals to ascertain the instar and species identity (Barra 1975, Szeptycki 1979, Soto-Adames 2008). However, most Collembola brought into the laboratory fail to survive long enough to produce first instar nymphs. Despite the large number of juveniles often seen in field-collected samples, first instar individuals are relatively difficult to find and species determination may be impossible if more than one congeneric species is found in the sample (Pan *et al.* 2011). In addition, first instar individuals are often not retained in historical collections because, in the absence of adults, species identification is judged to be at best problematic and at worst impossible.

While studying material of *Trogolaphysa* spp. collected in Mexico and Jamaica in the early 1950's, I came upon one individual that appeared to be a first instar juvenile of a new species. Initial observations on this specimen indicated that, contrary to the condition in adults, first instar chaetotaxy is nearly complete. However, the condition of the Mexican specimen was such that not all aspects of the chaetotaxy were visible. To corroborate initial observations on the individual from Mexico, collections of *Trogolaphysa* were made at a locality in Puerto Rico where only two very closely related species are known to occur. Here I present the first description of the complete dorsal chaetotaxy of first instar *Trogolaphysa jataca* (Wray, 1953b) and *T. paracarpenteri* **sp. nov.**, based on individuals collected in the field. I use this information to evaluate the homology of the chaetotaxy in adult *Trogolaphysa* proposed by Soto-Adames *et al.* (2014). In addition I described 12 new species of *Trogolaphysa* from Mexico, Jamaica and Argentina and provide additions to the description of *T. relictata* (Palacios-Vargas, Ojeda & Christiansen, 1985).