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## Phylogeny of the genus *Willemia* (Collembola: Hypogastruridae) and biogeography of the *W. buddenbrocki*-group with description of a new species from Ivory Coast (western Africa)

SERGE DÉMÉANGO ZON<sup>1</sup>, ANNE BEDOS<sup>2</sup> & CYRILLE A. D'HAESE<sup>2,3</sup>

<sup>1</sup>Université Félix Houphouët-Boigny de Cocody, UFR Biosciences, Laboratoire de Zoologie et de Biologie Animale, 22 BP582 Abidjan 22, Côte d'Ivoire

<sup>2</sup>Institut de Systématique, Évolution, Biodiversité, ISYEB – UMR 7205 – CNRS, MNHN, UPMC, EPHE, Muséum national d'Histoire naturelle, Sorbonne Universités, CP50 Entomology, 45 rue Buffon, F-75005 Paris, France.

<sup>3</sup>Corresponding author. E-mail: [dhaese@mnhn.fr](mailto:dhaese@mnhn.fr)

### Abstract

*Willemia tondoh* sp. nov. from the Ivory Coast (western Africa) is described and illustrated. The new species is the 14<sup>th</sup> in the *buddenbrocki*-group and is defined with two large globular sensilla placed in a cavity and covered in part by tegumental fold on antennal segment IV, 7 chaetae on antennal segment I, postantennal organ with 9 vesicles, s-chaetae subcylindrical and acuminate on abdominal terga and chaetae a1 absent on abdominal sternum IV. A phylogeny for all the 46 species of the genus *Willemia* is proposed. Based on the phylogenetic framework, the biogeography of the *buddenbrocki*-group is discussed. An identification key for all 46 known species of the genus is provided.

**Key words:** Poduromorpha, identification key, South Hemisphere

### Introduction

Knowledge on collembolan fauna from Africa is very scarce (Thibaud 2013). Nonetheless, the Poduromorpha genus *Willemia* Börner, 1901 has been recorded from the continent: *W. namibiae* Thibaud & Massoud, 1988 and *W. trilobata* Barra, 1995 were described from Namibia and South Africa respectively and *W. brevispina* Hüther, 1962 has been mentioned from Gambia (western Africa) by Murphy (1965). Another *Willemia* species, *W. nosyboraha* Thibaud, 2008 has been described from Madagascar.

The Ivory Coast collembolan fauna is known from 16 sites only with 79 recorded species (Zon *et al.* 2013), including 3 hypogastrurids but no *Willemia* species. To date, the genus *Willemia* includes 45 species (D'Haese & Thibaud 2011, Bu *et al.* 2012), making it one of the four more speciose Hypogastruridae genera along with *Ceratophysella* (133 spp.), *Hypogastrura* (169 spp.) and *Xenylla* (131 spp.). Several synthetic works have been published, dealing with revision of the *anophthalma*-group (D'Haese 1998), revision of the *buddenbrocki*-group (D'Haese & Weiner 1998) and phylogenetic and evolutionary analyses (D'Haese 2000, D'Haese & Thibaud 2011, Prinzing *et al.* 2014).

In the present work, we describe a new *Willemia* species from the Ivory Coast. Elaborating on the previous morphology based phylogenetic analyses (D'Haese 2000, D'Haese & Thibaud 2011), we include in the analysis the new species as well as two species, *W. antennomonstrum* Bu, Potapov & Gao, 2012 and *W. dhaesei* Bu, Potapov & Gao, 2012 not included in the previous publications. All 46 known *Willemia* species are then coded for 52 characters and phylogenetically analyzed to provide the most up to date phylogeny of the genus. The biogeography of the genus, and particularly of the *buddenbrocki*-group is commented through the obtained phylogenetic framework. Finally, an identification key to the 46 known species is provided.