



## A review of the moss bug genus *Xenophyes* (Hemiptera: Coleorrhyncha: Peloridiidae) from New Zealand: systematics and biogeography

DANIEL BURCKHARDT<sup>1</sup>, ESTÉE BOCHUD<sup>2</sup>, JAKOB DAMGAARD<sup>3</sup>, GEORGE W. GIBBS<sup>4</sup>,  
VIKTOR HARTUNG<sup>5</sup>, MARIE-CLAUDE LARIVIÈRE<sup>6</sup>, DENISE WYNIGER<sup>7</sup> & ISABELLE ZÜRCHER<sup>8</sup>

<sup>1</sup>Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland. E-mail: daniel.burckhardt@unibas.ch

<sup>2</sup>Länggasse 59c, CH-3600 Thun, Switzerland. E-mail: estee\_bochud@yahoo.de

<sup>3</sup>Laboratory of Molecular Systematics, Botanical Garden and Museum, Natural History Museum of Denmark, Sølvgade 83 Opg. S, 1307 Copenhagen K, Denmark. E-mail: jdamgaard@snm.ku.dk

<sup>4</sup>School of Biological Sciences, Victoria University, PO Box 600, Wellington, New Zealand. E-mail: george.gibbs@vuw.ac.nz

<sup>5</sup>Museum für Naturkunde—Leibniz Institute of Evolution and Biodiversity Research at the Humboldt University Berlin, Invalidenstrasse 43, 10115 Berlin, Germany. E-mail: viktor.hartung@mfn-berlin.de

<sup>6</sup>New Zealand Arthropod Collection, Landcare Research, Private Bag 92 170, Auckland, New Zealand. E-mail: larivierem@landcareresearch.co.nz

<sup>7</sup>Natur-Museum Luzern, Kasernenplatz 6, CH-6003 Luzern, Switzerland. E-mail: denise.wyniger@lu.ch

<sup>8</sup>Naturhistorisches Museum, Augustinergasse 2, CH-4001 Basel, Switzerland. E-mail: isabelle.zuercher@bs.ch

### Abstract

The moss bug genus *Xenophyes* from New Zealand is revised. Six species are recognised, four of which are described as new: *X. adelphus*, *X. goniomus*, *X. metoponcus*, and *X. rhachilophus*. The synonymy of *Xenophyes forsteri* with *X. cascus* is confirmed. Illustrated descriptions and identification keys are provided for the adult and the last instar. The male aedeagus is recognised as the most important structure to diagnose species. Other useful morphological characters include body shape, head, pronotum, and tegmina expressed as length and width measurements. The Principal Component Analysis (PCA) shows that five species are well separated from each other, but *X. goniomus* greatly overlaps with *X. cascus*, *X. kinlochensis*, and *X. rhachilophus*. There is also broad morphometric overlap between North Island and South Island specimens of *X. cascus*, confirming their conspecificity. Results from a Canonical Variate Analysis (CVA) determined which morphometric characters are most suitable for use in keys and descriptions. *X. cascus* is the only species occurring on both the North and South Islands. Other species are restricted to the South Island.

**Key words:** Coleorrhyncha, Peloridiidae, moss, New Zealand, taxonomy, multivariate analysis, distribution

### Introduction

Moss bugs or peloridiids are small hemipterous insects of the suborder Coleorrhyncha which live in the wet moss of temperate and subantarctic rain forests of the southern hemisphere (Chile, Argentina, New Zealand, New Caledonia, and Australia: Queensland, New South Wales including Lord Howe Island, Australian Capital Territory, Victoria, Tasmania). Along with southern beeches or trees of the genus *Nothofagus* (Nothofagaceae) they represent one of the much cited groups in Gondwana biogeography (Darlington 1965, Grimaldi & Engel 2005). Because of their cryptic life style, moss bugs are generally poorly represented in collections and there are still many gaps in the knowledge of this group. The last decade has seen important discoveries such as vibrational signalling (Hoch *et al.* 2006) and jumping behaviour (Burrows *et al.* 2007) in the Australian *Hackeriella veitchi* (Hacker), and the publication of an extensive taxonomic and phylogenetic treatment of the peloridiid world fauna comprising 17 genera and 32 species (Burckhardt 2009).

Three genera, *Xenophyes* Bergroth, *Oiophysa* Drake & Salmon, and *Xenophysella* Evans, with nine species, have been reported from New Zealand (Burckhardt 2009). Of the three genera, *Xenophyes* has the widest distribution and can be quite common in suitable habitats. *X. cascus* was described from a single male specimen from