



## First New Zealand record of the Australian species *Hemiodoecus leai* China, 1924 (Hemiptera: Peloridiidae); a hitchhiker on moss

MICHAEL D. WAKELIN<sup>1</sup> & MARIE-CLAUDE LARIVIÈRE<sup>2</sup>

<sup>1</sup> 47 Hunt Street, Andersons Bay, Dunedin 9013, New Zealand. E-mail: michael.wakelin@xtra.co.nz

<sup>2</sup> New Zealand Arthropod Collection, Landcare Research, Private Bag 92170, Auckland 1142, New Zealand. E-mail: LariviereM@landcareresearch.co.nz

### Abstract

The Australian mossbug *Hemiodoecus leai* China, 1924, is recorded for the first time in New Zealand based on repeated sampling from a self-sustaining population at Opoho Creek, Dunedin (South Island) since 2011. The history of the discovery of *H. leai*, probably accidentally introduced with moss used to transport fish ova from Tasmania, is summarised. A brief taxonomic treatment accompanied by illustrations and data on distribution, puts this discovery in context with the 2011 taxonomic review of New Zealand Peloridiidae published in the *Fauna of New Zealand* series. Biological notes based on field and laboratory observations are also provided.

**Key words:** mossbugs, taxonomy, distribution, biology, biosecurity

### Introduction

Mossbugs or Peloridiidae are primitive members of the order Hemiptera. Their current distribution and diversification resulted from the breakup of Gondwana. Peloridiids can be found feeding on the sap of moss in the temperate and subantarctic rainforests of Chile, Argentina, Australia, Lord Howe Island, New Caledonia and New Zealand. Although distributed from Northland to Stewart Island in New Zealand, no mossbug was previously known from the eastern South Island.

The discovery of the adventive species *H. leai* China, 1924, constitutes the first record of the genus *Hemiodoecus* China, 1924, for New Zealand and brings the number of known Peloridiidae for this country to four genera and 14 species. The endemic New Zealand genera *Oiophysa* Drake & Salmon, 1950 (5 species), *Xenophyes* Bergroth, 1924 (6 species), and *Xenophysella* Evans, 1982 (2 species) were reviewed by Burckhardt (2009), Burckhardt *et al.* (2011), and Larivière *et al.* (2011). The genus *Hemiodoecus*, an Australian endemic, was revised by Burckhardt (2009) and includes three species: *H. acutus* Burckhardt, 2009, from Victoria, *H. crassus* Burckhardt, 2009, from Australian Capital Territory, and New South Wales, and *H. leai* from New South Wales, Victoria, and Tasmania. *Hemiodoecus leai* may have been accidentally introduced to New Zealand in the second half of the 19th century with moss-containing fish ova shipments from Tasmania.

### New Zealand discovery of *Hemiodoecus leai*

The peloridiid species *Hemiodoecus leai* was first collected at Opoho Creek, Dunedin (South Island) in December 2011. Intermittently over the following two years a total of 14 adults and eight nymphs were caught by brushing moss in situ, and one additional adult was caught in a pitfall trap. Of these, 8 specimens were deposited in the New Zealand Arthropod Collection (NZAC) and three were kept alive for observation; the remainder were kept alive and released back into the field.

Opoho Creek runs adjacent to a suburb of the same name near Signal Hill, a few kilometres to the northeast of

were not seen jumping or climbing from the container and did not appear to be nocturnal. There was little reaction to contact with other organisms (a snail and a mite) but some kind of signalling may have occurred when a nymph's final moulting seemed to attract two other adult peloridiids. **Moulting** to adult was observed in two female nymphs, occurred in the early morning, facing downwards on a vertical stem. Prior to moulting, one nymph did not appear to feed and moved less than 1 cm over 26 days. After moulting, there was little activity, the newly emerged adults apparently not feeding or moving for 12 and 14 days. **Seasonality.** Adults were found in February, April, August and December; nymphs were found in January, February, April and August suggesting nymphs and adults may overwinter. **Lifespan** for a captive adult female was 15 months; another female and male kept in captivity are still alive after 21 and 25 months respectively. **Reproduction.** *H. leai* has paired ovaries each with five ovarioles and a spermatheca (Pendergrast 1962); upon dissection, one ovigerous female collected in December was observed to have about six fully formed eggs. Sixteen nymphs were found to have emerged in captivity between November and June. The eggs could have been laid as a result of mating observed 13 or 16 months prior in August and November. Alternatively the original moss collected may have contained eggs, indicating a minimum incubation of 22 months. It is not clear if the eggs were laid by one or both females, at one time or progressively over a longer time or if the nymphs emerged together. The 16 nymphs were noticed over a six month period; they developed slowly, most moulting to the second stage after about one month; only two nymphs moulting to the third stage after seven months; six nymphs died as first or second instar.

**Remarks.** Burckhardt (2009) keyed *H. leai* against the world fauna, described the adult and fifth instar nymph, and provided information on distribution and habitat in Australia (e.g., moss in rainforest, including *Nothofagus*, or sphagnum moss bogs at higher altitudes in the mountains of southeastern Australia).

## Acknowledgments

Thanks are given to John Steel, University of Otago (Dunedin) for moss identifications. The second author acknowledges partial funding provided by the Defining New Zealand's Biota research programme through Core funding for Crown Research Institutes from the Ministry of Business, Innovation and Employment's Science and Innovation Group.

## References

- Bergroth, E. (1924) A new genus of Peloridiidae (Hem.-Het.) from New Zealand. *Entomologist's Monthly Magazine*, 60, 178–181.
- Burckhardt, D. (2009) Taxonomy and phylogeny of the Gondwanan moss bugs or Peloridiidae (Hemiptera, Coleorrhyncha). *Deutsche Entomologische Zeitschrift*, 56 (2), 173–235.  
<http://dx.doi.org/10.1002/mmnd.200900019>
- Burckhardt, D., Bochud, E., Damgaard, J., Gibbs, G.W., Hartung, V., Larivière, M.-C., Wyniger, D. & Zürcher, I. (2011) A review of the moss bug genus *Xenophyes* (Hemiptera: Coleorrhyncha: Peloridiidae) from New Zealand: systematics and biogeography. *Zootaxa*, 2923, 1–26.
- China, W.E. (1924) A new genus of Peloridiidae from Tasmania. *Entomologist's Monthly Magazine*, 60, 199–203.
- Drake, C.J. & Salmon, J.T. (1950) A new genus and two new species of Peloridiidae from New Zealand. *Zoology Publications from Victoria University College*, 6, 63–67.
- Evans, J.W. (1982) A review of present knowledge of the family Peloridiidae and new genera and new species from New Zealand and New Caledonia (Hemiptera: Insecta). *Records of the Australian Museum*, 34 (5), 381–406. [1981]  
<http://dx.doi.org/10.3853/j.0067-1975.34.1982.296>
- Larivière, M.-C., Burckhardt, D. & Laroche, A. (2011) Peloridiidae (Insecta: Hemiptera: Coleorrhyncha). *Fauna of New Zealand*, 67, 1–78.
- Otago Daily Times (1868a) Trout Ova and Salmon Umbla Ova. *Otago Daily Times*, Issue 1990 (16 May 1868), 5.
- Otago Daily Times (1868b) Trout Ova From Tasmania. *Otago Daily Times*, Issue 2063 (15 September 1868), 3.
- Pendergrast, J.G. (1962) The internal anatomy of the Peloridiidae (Homoptera: Coleorrhyncha). *Transactions of the Royal Entomological Society London*, 114, 49–65.  
<http://dx.doi.org/10.1111/j.1365-2311.1962.tb01074.x>
- Smith, N. (2014) Youl, Sir James Arndell (1811–1904), Australian Dictionary of Biography, National Centre of Biography, Australian National University, Canberra. Available from: <http://adb.anu.edu.au/biography/youl-sir-james-arndell-4899/text8199> (accessed 8 February 2014)