ON THE EVOLUTION OF THE GENUS MICRODARWINULA DANIELOPOL, 1968 (OSTRACODA, DARWINULIDAE) WITH THE DESCRIPTION OF A NEW SPECIES FROM SEMI-TERRESTRIAL HABITATS IN SÃO PAULO STATE (BRAZIL)

BY

R. L. PINTO1,3, C. E. F. ROCHA1,4 and K. MARTENS2,5

1) Departamento de Zoologia, Instituto de Biociências — USP, Rua do Matão, trav. 14, nº 101, CEP 05508-900, São Paulo, SP, Brazil
2) Royal Belgian Institute of Natural Sciences, Freshwater Biology, Vautierstraat 29, B-1000 Brussels, Belgium; and University of Ghent, Dept. of Biology, K.L. Ledeganckstraat 35, B-9000 Ghent, Belgium

ABSTRACT

A new species in the genus Microdarwinula, M. inexpectata n. sp., is reported from semi-terrestrial habitats in São Paulo State, Brazil. Until the present findings, M. zimmeri (Menzel, 1916) was the only recent species known in the genus. Comparisons of valve and soft part morphology within the genus and among genera in the family Darwinulidae, corroborate recent studies suggesting that Microdarwinula originated from an ancestor in the genus Penthesilenula. The two species of Microdarwinula are the only darwinulids to lack an externally visible brooding cavity in the carapace. This could be a neotenic character, while soft parts appear to be fully developed. Microdarwinula zimmeri has a world-wide distribution, but it was never found in South America. On the other hand, M. inexpectata n. sp. is so far known only from two localities in São Paulo State.

RÉSUMÉ

Une nouvelle espèce du genre Microdarwinula, M. inexpectata n. sp., a été découverte dans des habitats semi-terrestres de l’État de São Paulo au Brésil. Jusqu’à cette découverte, M. zimmeri (Menzel, 1916) était la seule espèce récente connue de ce genre. La comparaison de la morphologie des valves et des parties molles au sein du genre Microdarwinula et également entre les différents genres de la famille Darwinulidae, corrobore les résultats d’études récentes qui suggestent que Microdarwinula a pour origine un ancêtre du genre Penthesilenula. Les deux espèces de Microdarwinula sont les seuls darwinulides qui ne présentent pas de cavité d’incubation visible sur l’extérieur de la carapace. Cette caractéristique pourrait être néoténique, tandis que les parties molles semblent

3) e-mail: rlpinto@ib.usp.br
4) e-mail: cefrocha@usp.br
5) Corresponding author; e-mail: martens@naturalsciences.be

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**INTRODUCTION**

The last decade has experienced a wide interest in recent Darwinulidae, an exclusively non-marine ostracode family. Their recognition as putative ancient asexuals (Butlin & Griffiths, 1993; Judson & Normark, 1996) provoked a series of evolutionary and taxonomic research projects. These include molecular screening (Schön & Martens, 2003; Schön et al., 2003), palaeontological studies (Martens et al., 2003), and regional faunistic surveys of Europe (Martens et al., 1997), South Africa (Martens & Rossetti, 1997; Rossetti & Martens, 1999), New Zealand and Australia (Rossetti et al., 1998; Rossetti & Martens, 1999; Martens & Rossetti, 2002). Also South American darwinulids provoked recent interest, as several species were found in semi-terrestrial habitats. Pinto et al. (2003) reported on two new species of the genus *Vestalenula*, while Pinto et al. (2004) reported three species of the genus *Penthesilenula*, one of which was new to science, while *P. aotearoa* (Rossetti, Eagar & Martens, 1998) was previously only known from New Zealand. The present paper reports on a new, semi-terrestrial species of *Microdarwinula*, which constitutes only the second recent species in the genus. Previous work on the phylogeny of extant Darwinulidae showed that *Microdarwinula* in all probability evolved from an ancestor in *Penthesilenula*, while analyses of the rate of molecular evolution in ostracode groups with different reproductive modes showed a significant increase in rate in the lineage leading to *Microdarwinula* (cf. Martens et al., 2005). Here, we describe the new species, compare valve and soft part morphology of both species of *Microdarwinula* with the phenotype of other Darwinulidae, and discuss the position of this genus within the family.

**MATERIAL AND METHODS**

Material used for the present paper was collected during preliminary sampling campaigns of (semi-)terrestrial habitats in the State of São Paulo, conducted by C.E.F. Rocha and J.W. Reid in 1999 and by C.E.F. Rocha and R.L. Pinto in 2001 and 2002. Ostracodes were sorted alive from washed leaf litter, mosses, etc., and killed and preserved in 70% ethanol. These collections contained several species from the families Darwinulidae, Cyprididae, and Candonidae (cf. Pinto et al., 2005). Dissections were effectuated with micro-needles under a stereomicroscope. Valves were stored dry in micropalaeontological slides; soft parts