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Aquatic and semiaquatic Heteroptera (Insecta) from Pitinga, Amazonas, Brazil

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ABSTRACT
A list of aquatic and semiaquatic Heteroptera from a collecting trip to Pitinga, a village in a mining area in the County of Presidente Figueiredo in the Central Amazon is presented. Identified were fifty five species of Heteroptera, distributed in 13 families. Among the insects collected, some are new records for this Amazonian region and in addition 3 apparently undescribed species of *Microvelia* and one of *Paravelia* remain for further study.

KEYWORDS: Aquatic Heteroptera, Gerromorpha, Nepomorpha, New state records

Heterópteros (Insecta) aquáticos e semi-aquáticos de Pitinga, Amazonas, Brasil

RESUMO
Uma lista de heterópteros aquáticos e semi-aquáticos coletados durante uma viagem a Pitinga, uma área de mineração no município de Presidente Figueiredo, na Amazônia Central, é apresentada. Foram coletadas 55 espécies de Heteroptera, distribuídas em 13 famílias. Entre os insetos coletados, alguns são registros novos para essa região amazônica.

PALAVRAS-CHAVE: Heterópteros aquáticos, Gerromorpha, Nepomorpha, Distribuição, Amazônia.

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INTRODUCTION

The Heteroptera comprise a widely distributed group of insects of vast economic and medical interest. A large majority of its species is terrestrial but some of them are well adapted to aquatic or semiaquatic life and are efficient predators. These forms are found in a great variety of aquatic environments from stagnant pools to running water and from leaf axils of bromeliads to open ocean.

Data on distributional patterns and habitat preferences of aquatic and semiaquatic Heteroptera in Brazil, within and among several habitats, as well as other basic biological and ecological information, are found dispersed in the literature. However, they are mainly for regional faunas of southern Brazil (Nieser, 1994; Nieser & Pelli, 1994; Nieser & Melo, 1997, 1999a, b; Nieser *et al*., 1997, 1999; Nieser & Polhemus, 1999; Nieser & Chen, 2002; Nieser & Lopez-Ruf, 2001; Vianna & Melo, 2002, 2003; Goulart *et al*., 2002; Melo & Nieser, 2004).

Problems with water quality and degradation of aquatic habitats are associated with human population expansion and to the type of land use which contribute to disrupt the ecological equilibrium of a region. Notwithstanding, the basic literature on invertebrate-aquatic communities focuses mainly on pathogens and some invertebrate vectors of parasitic diseases, and attempts to establish and select conservation priorities for riverine habitats within these areas are few.

In 2000, one of the authors (DLVP), aiming to obtain information regarding aquatic and semiaquatic Heteroptera in a mining area in central Amazonia, made some collecting trips to Pitinga, a village in the municipality of Presidente Figueiredo. Since no previous record of water bugs from this area is known to us, the results of that collecting trip are presented here.

MATERIAL AND METHODS

STUDY AREA

The Presidente Figueiredo municipality, founded in 1981, is located ca 107 km north of Manaus, covering an area of about 24,781 km^2, and is made up of several biological reserve and protected indigenous areas such as the Waimiri-Atroari.

Pitinga is a small mining town situated in the Waimiri-Atroari reserve, about 310 km from Manaus and 70Km south of the Equator (00°47'28.7"S; 60°04'12.2"W). This region is covered by tropical rain forest with an annual rainfall of more than 2000 mm. The typical geomorphologycal sets are composed of Palaeozoic sedimentary soils from pre-Cambrian age related to the Prosperança formation of siliciclastic rocks with dense drainage and shows subvulcanic intrusive and effusive granitic rocks (Radam, 1978; Nogueira & Sarges, 2001; Muller & Carvalho, 2005).

Samples were taken from several places in the village, which were considered to represent possible habitats for Heteroptera and to account for the ecological diversity of the aquatic environments. The sites included some ponds, puddles with rock and strips of vegetation on sand, bottom with small boulders, sand and or gravel, and the Pitinguinha and Perdigoto, rivers which are slow to moderately fast flowing, over 1m deep in some places, with rapids and riffles at quiet parts.

Macroinvertebrate samples were taken by sweeping the water column, edges and bottom of water bodies with entomological hand nets. The collected material was placed in plastic trays and the insects were sorted from detritus and transferred to vials containing 80% ethanol. In the laboratory, each sample was examined under a dissecting microscope and species identification was performed basically according to Nieser & Melo (1997). The sampled material was deposited in the entomological collection in the Department of Parasitology of the Federal University of Minas Gerais (DPIC).

RESULTS

Fifty five species of Heteroptera, distributed in 13 families, were collected. The dominance of Gerromorpha species (31) was found in all sites. Veliidae and Gerridae were the commonest families of Gerromorpha, making up 49.1% (27 species) and *Microvelia* spp. more than 10% (seven) of all recorded species from the Pitinga vicinities. Twenty nine species were found in Pitinguinha, 26 in Perdigoto creeks, some of which were common to both. In the other sites sampled, which represent more lentic habitats than the above mentioned creeks, the 32 species of Heteroptera found were grouped as other sites.

Some species of these families were described only from the Amazonian region and others are widespread and commonly found among marginal vegetation in standing waters of ponds or small puddles and in slow to moderately fast flowing streams from other regions of southern Brazil. Naucoridae was the major family of Nepomorpha (24) collected with 7 species (29.1%) recorded in the study area.

The great number of species found in a few types of ambient showed low frequency, but *Paravelia* sp. and *Rhagovelia* spp. were abundant. The checklist of species in the habitats sampled is shown in Table 1.

Table 1 - Species of aquatic Heteroptera collected in several sites in Pitinga, municipality of Presidente Figueiredo (Amazonas, Brazil), where (-)= absence and (+)= presence.

	Pitinguinha	Perdigoto	Other sites
Belostomatidae			
Belostoma discretum Montandon, 1903	-	-	+
Belostoma plebejum (Stål, 1858)	+	+	+
Belostoma micantulum (Stål, 1858)	-	+	-
Lethocerus sp.(larva)	-	-	+
Corixidae			
Heterocorixa similis Nieser, 1970	-	+	-
Tenagobia incerta Lundblad, 1928	+	+	-
Gelastocoridae			
Gelastocoris flavus (Guérin-Méneville, 1835)	-	-	+
Naucoridae			
Ambrysus bifidus La Rivers & Nieser, 1972	+	+	-
Ambrysus partridgei De Carlo, 1968	+	-	-
Ambrysus usingeri La Rivers, 1952	+	+	-
Ctenipocoris spinipes (Montandon, 1897)	-	-	+
Limnocoris birabeni De Carlo, 1967	-	-	+
Limnocoris burmeisteri De Carlo, 1967	+	+	-
Limnocoris illiesi De Carlo, 1967	+	-	+
Nepidae			
Ranatra macrophthalma Herrich-Schäffer, 1853	+	+	-
Ranatra subinermis Montandon, 1907	-	-	+
Ranatra tuberculifrons Montandon, 1907	+	-	-
Notonectidae			
Buenoa truxali Nieser, 1968	-	-	+
Martarega membranacea White, 1879	+	+	+
Notonecta pulchra Hungerford, 1926	-	-	+
Ochteridae			
Ochterus aeneifrons surinamensis Nieser, 1975	-	-	+
Ochterus perbosci (Guérin-Méneville, 1843)	-	-	+
Ochterus tenebrosus Nieser, 1975	-	-	+
Pleidae			
Neoplea absona Drake & Chapman, 1953	+	-	+
Gerridae			
Brachymetra lata Shaw, 1933	+	+	-
Cryptobatoides bruneus Polhemus, 1991	+	-	-
Cylindrosthetus palmaris Drake & Harris, 1934	-	+	-
Limnogonus aduncus Drake & Harris, 1933	+	+	+
Limnogonus hialinus (Fabricius, 1803)	-	-	+
Neogerris lotus (White, 1879)	-	-	+
Neogerris visendus (Drake & Harris, 1934)	-	-	+
Ovatametra obesa Kenaga, 1942	+	-	+
Rheumatobates crassifemur esakii Schroeder, 1931	-	-	+
Telmatometra fusca Kenaga, 1941	-	-	+
Hebridae			
Hebrus sp. (larva)	-	-	+
Merragata hebroides White, 1877	-	-	+
Hydrometridae			
Hydrometra argentina Berg, 1879	-	+	+
Mesoveliidae			
Mesovelia amoena Uhler, 1894	+	+	+
Veliidae			
Microvelia hinei Drake, 1920	+	+	-
Microvelia mimula White, 1879	+	+	-
Microvelia pulchella Westwood, 1834	+	+	-
Microvelia venustatis Drake & Harris, 1933	-	-	+
Microvelia sp.1	+	-	+
Microvelia sp.2	-	-	+
Microvelia sp.3	-	-	+
Rhagovelia amazonensis Gould, 1931	+	+	-
Rhagovelia evides Bacon, 1948	+	+	-
Rhagovelia tenuipes Champion, 1898	+	+	-
Rhagovelia traili (Buchanan-White, 1879)	-	-	+
Paravelia bulliallata Polhemus & Polhemus, 1984	+	+	-
Paravelia dilatata Polhemus & Polhemus, 1984	+	+	-
Paravelia sp.	+	+	+
Stridulivelia stridulata (Hungerford, 1929)	+	+	-
Stridulivelia tersa (Drake & Harris, 1941)	+	+	-
Stridulivelia transversa (Hungerford, 1929)	+	+	-

DISCUSSION

Among the insects collected, some are new records for the Amazonian region, including *Belostoma plebejum, Rhagovelia tenuipes* (known from the states of Pará and Minas Gerais), *Ochterus aeneifrons surinamensis,* a subspecies described from Suriname by Nieser (1975), and undescribed species of *Microvelia*. Apparently, this area is rich in *Microvelia*. One of the species of this genus may have been previously described, but not the others, such as the *Paravelia*.

The sampling sites, comprising permanent and semi-permanent lotic and lentic habitats in the current study, did not present distinct family compositions. However, the relative homogeneity of species distribution among Nepomorpha and Gerromorpha, suggesting a lower variability on the species composition, should be viewed carefully, because some of them probably could be displaced by others, ecologically more tolerant, from the same genera as consequence of changes in general habitat traits from human impact. As far as we know, no previous study from unmodified aquatic bodies or species list was given, yet we are unable to affirm whether or not the present records represent a poor diversity of heteropteran for this region. In fact standing water, leaf litter and emergent macrophytes that are rare in some sites sampled could influence the distribution of these insects.

A few studies of aquatic insects associated with mining activities deal with high acidified water bodies (Jarvis & Younger, 1997; Winterbourn *et al.*, 2000), or they exclude the Gerromorpha from data analysis (Proctor & Grigg,

2006) and in a *stricto sensu* are not applicable in the present report. The results obtained suggest that the mining activities did not exclude the heteropteran community from this area, despite evidence that biotic and abiotic factors can influence population distribution and community assembly in different ways. Among them, the water physicochemical properties, structural patterns of the water sources and water permanence, presence of macrophytes in shaping aquatic habitats, physiological tolerance, colonization abilities and food availability. On the other hand, some studies on species composition, correlation between age and size of aquatic habitats in a mining area were verified (Palmer, 1981; Adams & Robbins, 1982, 1990) but, studies on heteropteran community structure in a wide range of habitats could not be directly compared. However, they support some of the patterns suggested by the present study (Nieser, 1975; García-Avilés *et al*., 1996; González-Martínez & Valladares-Díez, 1996; Larsen & Olson, 1997; Goulart *et al*., 2002; Vianna & Melo, 2003). Studies on heteropteran fauna from several natural water bodies far from mining sites in southern Brazil have shown a similar distributional pattern in family composition, and the number of species sampled was also similar (Vianna & Melo, 2003; Melo & Nieser, 2004; Pelli *et al.*, 2006; Sousa *et al*., 2006).

Although many of the species recorded are ecologically important, additional information on distributional patterns and faunistic aspects of the aquatic and semiaquatic Heteroptera in Pitinga is needed for a definitive biogeographycal analysis, as this list is probably not complete.

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