

A catalogue of *Helobdella* (Annelida, Clitellata, Hirudinea, Glossiphoniidae), with a summary of leech diversity, from South America

Um catálogo de *Helobdella* (Annelida, Clitellata, Hirudinea, Glossiphoniidae), com um sumário da diversidade de sanguessugas, da América do Sul

Martin Lindsey Christoffersen¹
mlchrist@dse.ufpb.br

Abstract

A catalogue of *Helobdella* produced 46 nominal species reported to date from South America. Only 14 species of *Helobdella* had been registered for South America until 1981. Almost 90% of the present fauna is endemic to the South American continent. Only five species occur in more northern latitudes. Raul Adolfo Ringuelet has described 35% of the species known today. Full synonyms and detailed South American occurrences are provided. This is the first reassessment of South American *Helobdella* in 27 years. A dominant feature of the South American leech fauna is the presence of many terrestrial predaceous forms. There are now 139 species of leeches in South America. Almost 88% of this fauna is endemic. Most endemic forms (52 species) come from subtropical latitudes, but this pattern may reflect the vagaries of sampling and place of residence of the main South American leech specialist.

Key words: biodiversity, distribution patterns, leeches, Neotropical region.

Resumo

Um catálogo de *Helobdella* produziu 46 espécies para a América do Sul. Somente 14 espécies de *Helobdella* tinham sido registradas para a América do Sul até 1981. Quase 90% desta fauna é endêmica para o continente sul americano. Somente cinco espécies ocorrem em latitudes mais setentrionais. Raul Adolfo Ringuelet descreveu 35% das espécies conhecidas hoje. Sinonímias completas e ocorrências detalhadas na América do Sul são fornecidas. Esta é a primeira reavaliação dos *Helobdella* sulamericanos em 27 anos. Um fator dominante da fauna de sanguessugas sulamericanas é a presença de muitas formas terrestres predadoras. Há agora 139 espécies de sanguessugas conhecidas da América do Sul. Quase 88% desta fauna é endêmica. A maioria das espécies endêmicas (52 espécies) provém de latitudes subtropicais. Este padrão pode refletir as conveniências das amostragens e o local de residência do principal especialista em sanguessugas da América do Sul.

Palavras-chave: biodiversidade, padrões de distribuição, região Neotropical, sanguessugas.

¹ Departamento de Sistemática e Ecologia,
Universidade Federal da Paraíba, Campus I,
58059-900, João Pessoa, Paraíba, Brazil.

Introduction

Helobdella is by far the most diverse genus of leeches in South America. Although a few species extend their known ranges variously into Central America, North America, Europe or as far as western Asia, this taxon is thought to have originated in South America (Siddall *et al.*, 2005), with a hotspot of diversity located in the Andean plateaus of Chile (Siddall and Borda, 2004, p. 2). The species are generally small and dorso-ventrally flattened, having a proboscis, gonopores separated by one annulus and one pair of cephalic eyespots. Their ancestor appears to have given up blood-feeding in favor of predation of aquatic invertebrates (mainly oligochaetes and mollusks). The presence of nuchal glands on somite eight is perhaps the best recognized character within the genus (Siddall and Borda, 2003, p. 28). They probably form a sister group relationship with *Haementeria* or *Haementeria-Placobdella*, the latter genus representing North American relatives of *Haementeria*, one species being European.

Members of *Helobdella* display the most advanced parental care. *Helobdella* contains the only 'prearthropodian' examples of parent animals feeding their young (Kutschera and Wirtz, 2001, p. 130). In brooding *H. stagnalis*, the sides of the body often inflect ventrally as the body arches in such a way as to enclose the egg sacs in a temporary brood chamber. This evolutionary trend apparently culminates in the African *Marsupiobdella africana* Goddard and Malan (1912), which has large yolky eggs and bear their young in a specialized internal incubatory pouch (Sawyer, 1971, p. 202). Introductions of species could easily have been coincident with accidental introductions of aquatic invasive plant species (Siddall and Budinoff, 2005, p. 470). *Helobdella europaea*, despite its name, would seem to have originated in South America.

Since the efforts of Ringuelet (1981a), no species inventories of the *Helobdella* from South America have been attempted. Ringuelet (1981a) cited 14 species of *Helobdella* for the South American continent.

In this paper, a catalogue of the species of *Helobdella* cited to date from the South American continent is provided, and the known distribution patterns of all leeches from South America is summarized.

Material and methods

Three-letter abbreviations for South American countries have been used (ARG, Argentina; BOL, Bolivia; BRA, Brazil; CHI, Chile; COL, Colombia; ECU, Ecuador; FRG, French Guyana; PAR, Paraguay; PER, Peru; URU, Uruguay; VEN, Venezuela) and 2-letter abbreviations for sampled States in Brazil (CE, Ceará; MG, Minas Gerais; PB, Paraíba; PE, Pernambuco; RJ, Rio de Janeiro; RN, Rio Grande do Norte; RS, Rio Grande do Sul; SC, Santa Catarina; SP, São Paulo).

Results

Species marked with an asterisk (*) are previously only reported from South America.

GLOSSIPHONIIDAE Vaillant, 1890

Helobdella R. Blanchard, 1896

Type: *H. stagnalis* Linnaeus, 1758

Synonyms. *Anoculobdella* Weber, 1915 (Type: *Anoculobdella brasiliensis* Weber, 1915); *Glossiphonia* Johnson, 1825 (part); *Desmobdella* Oka, 1930 (Type: *Desmobdella paranensis* Oka, 1930); *Oculobdella* Autrum, 1936; *Adaetobdella* Ringuelet, 1978 (Type: *Adaetobdella cryptica* Ringuelet, 1978b); *Acritobdella* Ringuelet, 1978 (Type: *Helobdella longicornis* Weber, 1915); *Dacnobdella* Ringuelet, 1978 (Type: *Batrachobdella xenoica* Ringuelet, 1975); *Gloiobdella* Ringuelet,

1978 (Type: *Helobdella michaelsoni* R. Blanchard, 1900).

Helobdella adiasstola Ringuelet, 1972

Distribution. ARG (Ringuelet, 1972a, p. 99; Siddall, 2007a): Paraná-Entre Ríos (Pavé and Marchese, 2005, p. 188); Buenos Aires: Los Talas (Gullo, 1998, p. 65); Río de la Plata, associated with bivalve *Limnoperna fortunei* (Darrigan *et al.*, 1998, p. 226); URU (Ringuelet, 1972a, p. 99); PAR; PER; BRA: RS; SC; PE; PB; RN; CE (Ringuelet, 1981a, p. 192).

Further distribution. Mexico (Ringuelet, 1972a, p. 99) and South Africa (Negm-Eldin *et al.*, 2000, p. 257).

* *Helobdella ampullariae*
Ringuelet, 1945

Distribution. South America (Ringuelet, 1945, p. 95). ARG: Entre Ríos Prov.: El Salto (type loc.) (Siddall, 2007a); Uruguay river; La Plata river: Punta Lara, a parasite of the pallial cavity of snails *Ampullaria* sp. (Ringuelet, 1945, p. 95, 1949, p. 153); Plata basin, symbiotic with gastropod *Pomacea canaliculata* (D'Orbigny, 1835) (Vega *et al.*, 2006, p. 367); rio de la Plata estuary, in mantle cavity of *P. canaliculata* (Damborenea *et al.*, 2006, p. 457).

* *Helobdella araucana*
Ringuelet, 1978

Distribution. ARG: Neuquén: Glacial lakes Lácar and Aluminé (Ringuelet, 1978a, p. 261; Siddall, 2007a).

* *Helobdella bolivianita*
Siddall, 2001

Distribution. BOL: Santa Cruz Dep: Volcán lagune (Siddall, 2001a, p. 3).

* *Helobdella brasiliensis*
(Weber, 1915)

Previous name. *Anoculobdella brasiliensis* Weber, 1915.

Synonyms. *Placobdella taeniata*

Cordero, 1937; *Helobdella taeniata* (Cordero, 1937).

Distribution. ARG: Central; URU (Ringuelet, 1945, p. 95); BRA: RS (Weber, 1915, p. 46; Siddall, 2007a); North (Ringuelet, 1968, p. 378).

* *Helobdella budgei* (Grube, 1871)

Previous name. *Clepsine budgei* Grube, 1871.

Distribution. BRA: SC: Florianópolis (Desterro) (Grube, 1871, p. 87; Pinto, 1923, p. 937).

* *Helobdella chaquensis* (Ringuelet, 1978)

Previous name. *Adaetobdella chaquensis* Ringuelet, 1978.

Distribution. ARG: East Florencia: Formosa (Ringuelet, 1978b, p. 271; Siddall, 2007a).

* *Helobdella chilensis* R. Blanchard, 1900

Distribution. CHI: Valparaíso (type loc.); Puerto Mott; Santiago (Weber, 1915, p. 35). ARG: Tierra del Fuego: Ushuaia (R. Blanchard, 1900, p. 1; Weber, 1915, p. 35; Pinto, 1923, p. 942).

* *Helobdella columbiensis* (Ringuelet, 1975)

Previous names. *Bathrachobdella columbiensis* Ringuelet, 1975; *Dacnobdella columbiensis* (Ringuelet, 1975).

Distribution. COL (Ringuelet, 1978b, p. 269).

Remarks. This species is distinct from *Blanchardiella columbiensis* Weber, 1913, another glossiphoniid leech occurring in Colombia.

* *Helobdella cordobensis* Ringuelet, 1943

Previous name. *Helobdella triserialis cordobensis* Ringuelet, 1943.

Distribution. CHI: Neltume lake, 214 m deep (Siddall and Borda, 2004, p. 10); Cafalquen lake (Siddall

and Budinoff, 2005, p. 468); ARG: Córdoba Prov: Tanti (Ringuelet, 1943, p. 215; Siddall, 2007a).

* *Helobdella cryptica* Ringuelet, 1978

Further name. *Adaetobdella cryptica* (Ringuelet, 1978).

Distribution. CHI: Tarapaca (Ringuelet, 1978b, p. 269; Siddall, 2007a).

* *Helobdella diploides* Ringuelet, 1948

Distribution. ARG (Gullo, 2002, p. 89); PAR: Villarica (Ringuelet, 1948, p. 221; Siddall, 2001b, p. 5; 2007a).

* *Helobdella dubia* (Ringuelet, 1958)

Previous names. *Batrachobdella dubia* Ringuelet, 1958; *Adaetobdella dubia* (Ringuelet, 1958).

Distribution. ARG: Santa Cruz: Argentine lake (type loc.). CHI: Conchi (Ringuelet, 1958, p. 121; Siddall, 2007a).

* *Helobdella duplicata aplacophora* Ringuelet, 1958

Previous name. *H. duplicata* var. *aplacophora* Ringuelet, 1958.

Distribution. ARG: Santa Cruz: Argentine lake (Ringuelet, 1958, p. 128).

* *Helobdella duplicata duplicata* (Moore, 1911)

Previous name. *Clepsine (Glossiphonia) duplicata* Moore, 1911.

Distribution. CHI (Ringuelet, 1972b, p. 345); Panguipulli and Villarica lakes (Siddall and Borda, 2004, p. 8); ARG (Ringuelet, 1949, p. 149): Patagonia (Moore, 1911, p. 681); BOL (Ringuelet, 1953, p. 216); BRA: RS (De Avila Goulart, 1963, p. 4).

* *Helobdella duplicata tuberculata* Ringuelet, 1958

Previous name. *Helobdella duplicata*

var. *tuberculata* Ringuelet, 1958.

Distribution. ARG: Santa Cruz: Argentine lake (Ringuelet, 1958, p. 128). BRA: RS (De Avila Goulart, 1967, p. 3).

* *Helobdella elongata* Castle, 1900

Previous name. *Gloiobdella elongata* (Castle, 1900).

Distribution. South America (Castle, 1900, p. 39).

Helobdella europaea Kutschera, 1987

Synonyms. *Helobdella striata* Kutschera, 1985 (nom. preoc.); *Helobdella papillornata* Govendich and Davies, 1998.

Distribution. South America (Kutschera, 2004, p. 153; Siddall and Budinoff, 2005, p. 467).

Further distribution. Europe (Kutschera, 2004, p. 153), South Africa (Siddall and Budinoff, 2005, p. 468), Australia (Pfeiffer *et al.*, 2004, p. 214), New Zealand and Hawaii (Siddall and Budinoff, 2005, p. 468).

* *Helobdella festae* (Dequal, 1916)

Previous name. *Podocleipsis festae* Dequal, 1916.

Distribution. ECU: Cañar: Culebritas lake (Dequal, 1916, p. 1; Siddall, 2007a); Guayas: Balzar; Vines; Chuquipoquio; Cañar: Paredones; Pichincha: Papallacta (Ringuelet, 1981a, p. 193); Juli bay (Ringuelet, 1981a, p. 192). PER: Titicaca lake (Ringuelet, 1959, p. 187; Dejoux, 1992, p. 307).

Remarks. This species should not be confused with *Blanchardiella festai* Dequal, 1916 from Ecuador, previously also known as *Oxytychus festai* (Dequal, 1916).

* *Helobdella gemmata* R. Blanchard, 1900

Further name. *Bathrachobdella gemmata* (R. Blanchard, 1900).

Distribution. CHI: Putable, near Valdivia (type loc.) (R. Blanchard, 1900, p. 1; Weber, 1915, p. 32; Pinto, 1923, p. 939). ARG (Ringuelet, 1944, p. 51). URU: near Montevideo: Independencia (R. Blanchard, 1900, p. 1; Weber, 1915, p. 40; Pinto, 1923, p. 939); BRA: South (Ringuelet, 1981b, p. 226).

* *Helobdella godeti* Weber, 1916

Distribution. PER: Andes (Weber, 1916, p. 115; Siddall, 2007a).

* *Helobdella hemispherica*
Weber, 1913

Distribution. COL: Pedropalo lagune (Weber, 1913, p. 731, 1915, p. 40; Pinto, 1923, p. 944).

* *Helobdella huaroni* Weber, 1916

Distribution. PER: Junín: Huarón lake (Weber, 1916, p. 115; Ringuelet, 1981a, p. 192).

* *Helobdella hyalina* Ringuelet, 1942

Distribution. CHI: Patagonia: Esquel Percy river system (Miserandino and Pizzolón, 2000, p. 64). ARG: Buenos Aires Prov.: Santiago island (Ringuelet, 1942, p. 364; Siddall, 2007a); Buenos Aires: Los Talas (Gullo, 1998, p. 65, 2001, p. 17, 2002, p. 89, 2004, p. 13); Berisso (Gullo, 1999, p. 31); URU (Ringuelet, 1942, p. 364); PER: Junín Dep: San José (Ringuelet, 1981a, p. 192); BRA: South (Ringuelet, 1981b, p. 226).

Helobdella lineata (Verrill, 1874)

Previous names. *Clepsine papillifera* var. *lineata* Verrill, 1874; *Helobdella triserialis lineata* (Verrill, 1874); *Glossiphonia lineata* (Verrill, 1874).

Distribution. VEN: Guárico State: Pascua valley. ARG. URU. BRA: SC; PE; PB (Ringuelet, 1981a, p. 192).

Further distribution. Guatemala, Cuba, Mexico, USA and Canada (Ringuelet, 1981a, p. 192; Siddall, 2007a).

Remarks. Although a variable species

previously considered as belonging to *H. triserialis*, Sawyer and Shelley (1972) recognize *H. lineata* as a unique species. The species *H. lineata* (Castle, 1900) is now considered a North American species occurring as far south as Cuba (Siddall, 2007a, b). Thus, Ringuelet's (1944, p. 5, 1981a, p. 192) references for South America may belong to other closely related species. Until this possibility becomes formally established, these references of *H. lineata* for South America remain in the list.

* *Helobdella longicollis* Weber, 1915

Further name. *Acritobdella longicollis* (Weber, 1915).

Distribution. PAR: San Bernardino (Weber, 1915, p. 41; Pinto, 1923, p. 945; Siddall, 2007a).

* *Helobdella luteopunctata* (Apáthy, 1905, in Weber, 1915)

Previous name. *Placobdella luteopunctata* Apáthy, 1905, in Weber, 1915.

Distribution. CHI: Frutillar: Llanguihul lake (Apáthy 1905, in Weber, 1915; Ringuelet, 1981b, p. 226).

* *Helobdella malvinensis*
(Ringuelet, 1978a)

Previous name. *Adaetobdella malvinensis* Ringuelet, 1978a.

Distribution. ARG: Malvina islands: Malo river (Ringuelet, 1978b, p. 272; Siddall, 2007a).

* *Helobdella michaelsoni*
R. Blanchard, 1900

Further name. *Gloiobdella michaelsoni* (R. Blanchard, 1900).

Synonym. *Helobdella anoculis* Weber, 1915.

Distribution. CHI: Valdivia (type loc.) (Siddall, 2007a); South Patagonia: Punta Arenas, 3000 m deep; South of Tierra del Fuego: Ushuaia (R. Blanchard, 1900, p. 1); Calafuen, Neltume, Panquippulli and Villarica lakes (Siddall and Borda,

2004, p. 10). ARG: Buenos Aires: Barracas del Sur (R. Blanchard, 1900, p. 1; Ringuelet, 1949, p. 148); La Plata river: Bagliardi shore (Damborenea and Gullo, 1996, p. 97). URU: Montevideo: Prado (R. Blanchard, 1900, p. 1; Pinto, 1923, p. 940). PAR (Ringuelet, 1948, p. 218); BOL: Lake Titicaca (Dejoux, 1992, p. 307); PER: Puno: Desaguadero river in Titicaca basin; Trujillo: La Libertad: Trujillo; BRA: RS (Weber, 1915, p. 43).

* *Helobdella nahuelhuapensis*
Gullo, 2006

Distribution. ARG: Bariloche (Gullo, 2006, p. 33).

* *Helobdella nununumunojensis*
Siddall, 2001

Distribution. BOL: La Paz Prov: Ulla Ulla National Fauna and Biosphere Reserve (Siddall, 2001b, p. 5); Madidi; Ulla Ulla (Siddall and Borda, 2003, p. 25).

* *Helobdella obscura*
(Ringuelet, 1942)

Previous name. *Gloiobdella obscura* Ringuelet, 1942.

Distribution. ARG: Buenos Aires Prov: Pergamino (Ringuelet, 1942, p. 364; Siddall, 2007a). BOL. PER: Hacienda Pachacayo (Ringuelet, 1981a, p. 192). BRA: RS (De Avila Goulart, 1967, p. 3); South (Ringuelet, 1981a, p. 192).

* *Helobdella paranensis* (Oka, 1930)

Previous name. *Desmobdella paranensis* Oka, 1930.

Distribution. South America (Oka, 1930, p. 239). URU: Aspinas brook (Siddall and Borda, 2003, p. 25). BRA (Oka, 1932, p. 319).

* *Helobdella peruviansis*
Weber, 1916

Distribution. PER: Natichocha lake (Weber, 1916, p. 115); Junín Dep: Lavandera lake (Ringuelet, 1981a, p.

192); Titicaca lake (Ringuelet, 1959; Siddall, 2007a).

* *Helobdella pichipanan*
Siddall and Borda, 2004

Distribution. CHI: near Santiago: Chico lake (Siddall and Borda, 2004, p. 12); Huerquebve lake (Siddall *et al.*, 2005, p. 105).

* *Helobdella ringueleti* Siddall, 2001

Distribution. BOL: La Paz Prov: Madidi National Park: Tojoloque valley (Siddall, 2001b, p. 4).

* *Helobdella scutifera*
R. Blanchard, 1900

Synonyms. *Helobdella crassa* Apáthy, 1905, in Weber, 1915; *Helobdella similis* Ringuelet, 1942; *Gloibdella similis* (Ringuelet, 1942).

Distribution. CHI: South Patagonia: Punta Arenas (R. Blanchard, 1900, p. 1; Siddall, 2007a); South Tierra Del Fuego: Ushuaia: Picton island (R. Blanchard, 1900, p. 1; Moore, 1911, p. 669); Susanna cove; Puerto Montt (Weber, 1915, p. 31). ARG: Buenos Aires (R. Blanchard, 1900, p. 1; Ringuelet, 1949, p. 149); URU: Uschuaia: Tierra del Fuego (Weber, 1915, p. 31); Montevideo: Colon (R. Blanchard, 1900, p. 1); PAR (Ringuelet, 1948, p. 215); COL (Pinto, 1923, p. 938); VEN (Dresscher and Engel, 1948, p. 87); BRA: SC: Blumenau (Weber, 1915, p. 31); RN (Cordero, 1937a, p. 14).

* *Helobdella simplex* Moore, 1911

Synonym. *Helobdella (Podocleipsis) montevidensis* Cordero, 1937.

Distribution. CHI (Ringuelet, 1972b, p. 345): Panguipulli, Villarica and Tinquilco lakes (Siddall and Borda, 2004, p. 9); ARG (Ringuelet, 1949, p. 150): Chubut Prov. (Moore, 1911, p. 669; Siddall 2007a); Buenos Aires: Los Talas (Gullo, 1998, p. 65); Rio de la Plata (Paggi *et al.*, 2006, p. 5);

URU (Cordero, 1937b, p. 22); PER: Puno Dep: Pomata (Ringuelet, 1981a, p. 192); Titicaca lake (Dejoux, 1992, p. 307).

* *Helobdella sorojchi* Siddall, 2001

Distribution. BOL: La Paz Dep: Madidi National Park: Quanchis Qocha (Siddall, 2001b, p. 9).

Helobdella stagnalis
(Linnaeus, 1758)

Synonyms. *Hirudo bioculata* Bergmann, 1757; *Erpobdella bioculata* (Bergmann, 1757); *Clepsine bioculata* (Bergmann, 1757); *Glossopora bioculata* (Bergmann, 1757); *Helluo (Hirudo) bioculata* (Bergmann, 1757); *Helobdella bioculata* (Bergmann, 1757); *Helluo (Hirudo) bioculatus* (Bergmann, 1757); *Glossobdella bioculata* (Bergmann, 1757); *Glossiphonia bioculata* (Bergmann, 1757); *Helobdella bioculata* (Bergmann, 1757); *Hirudo pulligera* Daudin, 1800; *Hirudo (Glossobdella) puligera* (Daudin, 1800); *Hirudo circulans* Sowerby, 1806; *Glossipora circulans* (Sowerby, 1806); *Glossopora circularis* (Sowerby, 1806); *Glossiphonia circulans* (Sowerby, 1806); *Glossiphonia perata* Johnson, 1816; *Glossopora punctata* Johnson, 1817; *Glossiphonia punctata* (Johnson, 1817); *Hirudo stagnorum* Derheims, 1825; *Clepsine sowerbyi* Moquin-Tandón, 1826; *Clepsine filippi* Polonio, 1863; *Clepsine modesta* Verrill, 1872; *Glossiphonia modesta* (Verrill, 1872); *Helobdella modesta* (Verrill, 1872); *Clepsine submodesta* Nicholson, 1872; *Clepsine viridissima* Picaglia, 1877; *Bakebdella gibbosa* Sciacchitano, 1939; *Glossiphonia scutifera* Young, 1894).

Previous names. *Hirudo stagnalis* Linnaeus, 1758; *Glossiphonia stagnalis* (Linnaeus, 1758); *Glossiphonia (Helobdella) stagnalis* (Linnaeus, 1758); *Erpobdella stagnalis* (Linnaeus, 1758); *Clepsine stagnalis* (Linnaeus, 1758).

Distribution. CHI: Valdivia (Weber, 1915, p. 26). ARG (Ringuelet, 1949, p. 146); PAR (Ringuelet, 1981a, p.

192). COL: Cundinamarca: Boca del Monte; Páramo Cruz Verde (Weber, 1915, p. 27); PER: Junín Dep.; ECU: Cañar: Culebrillas lake; Cuenca (Ringuelet, 1981a, p. 192); BRA: RS: Porto Alegre (Weber, 1915, p. 27); RJ; MG (Ringuelet, 1981a, p. 192).

Further distribution. Mexico, United States, Canada, Europe, and western Asia (Ringuelet, 1981a, p. 192). The species apparently occurs on every continent except Australia (Siddall, 2007b).

Remarks. The species is common in South America, except in the high Andes (Siddall, 2007a).

* *Helobdella striata* Ringuelet, 1942

Distribution. ARG; URU (Ringuelet, 1942, p. 364).

* *Helobdella titicacensis*
Ringuelet, 1959

Further name. *Adaetobdella titicacensis* (Ringuelet, 1959).

Distribution. PER: Titicaca lake (Ringuelet, 1959, p. 187, 1960, p. 193; Siddall, 2007a); Grande lake (Dejoux, 1992, p. 307); Puno: Pomata river; Zapatilla river; Junín: Carhumayo; Cuzco: San Geronimo stream; Oxapampa: Saracola lake; Gracachimpa, Quebrada de Anticocha, Cazapato; Pasco: San José (Ringuelet, 1981a, p. 192).

Helobdella triserialis
(E. Blanchard, 1849)

Synonyms. *Clepsine lineolata* Grube, 1871; *Glossiphonia lineolata* (Grube, 1871); *Clepsine papillata* var. b Verrill, 1872; *Glossiphonia fusca* Castle, 1900; *Glossiphonia (Helobdella) fusca* (Castle, 1900); *Helobdella punctata-lineata* Moore, 1939; *Helobdella nigricans* Ringuelet, 1943; *Helobdella unilineata* Ringuelet, 1943; *Helobdella trialbolineata* Klemm, 1974).

Previous names. *Glossiphonia triserialis* E. Blanchard, 1849; *Clepsina triserialis* (E. Blanchard, 1849);

Distribution. CHI: Carelmapu (E. Blanchard, 1849, p. 37; Siddall 2007a); Concepción (Weber, 1915, p. 28). ARG (Ringuelet, 1949, p. 148): Buenos Aires Prov (Gullo, 2003, p. 1); Los Talas (Gullo, 1998, p. 65): Rio de la Plata (Paggi *et al.*, 2006, p. 5). URU. PAR: (Ringuelet, 1948, p. 214): San Bernardino (Weber, 1915, p. 28). BOL: Santa Cruz Dep: Volcán lagune (Siddall, 2001a, p. 3). COL: Laguna Petropalo (Weber, 1915, p. 28). VEN: Caracas (Weber, 1915, p. 28). FRG (Ringuelet, 1972a, p. 99, 1981a, p. 192). BRA (Cordero, 1937a, p. 16): RS (De Avila Goulart, 1963, p. 5); Porto Alegre (Pinto, 1923, p. 995); SC: Florianópolis (Desterro) (Weber, 1915, p. 28); SP; PE; PB; CE (Ringuelet, 1981a, p. 192).

Further distribution. Costa Rica, Guatemala (Ringuelet, 1972a, p. 99, 1981a, p. 192), Mexico (Oceguera-Figueroa, 2007, p. 16) and USA (Klemm, 1972, p. 405).

Remarks. *H. socimulcensis* Caballero, 1931 has been resurrected from the synonymy of *H. triserialis*, as a valid species for Mexico (Oceguera-Figueroa *et al.*, 2007, p. 15). Siddall (2007a) recognizes *H. triserialis* var. *unilineata* Ringuelet, 1943 and *H. triserialis* var. *nigricans* Ringuelet, 1943 in his key to South American freshwater leeches. *H. triserialis* represents a complex of forms or a complex of species.

* *Helobdella trituberculata*
(Weber, 1915)

Previous name. *Anoculobdella trituberculata* Weber, 1915.

Distribution. CHI: Concepción (Weber, 1915, p. 1). PAR (Weber, 1915, p. 48). BRA: RS: Porto Alegre (Weber, 1915, p. 48; Pinto, 1923, p. 995).

* *Helobdella villarsi* Weber, 1916

Distribution. PER: Junín: Huarón lake (Weber, 1916, p. 115; Ringuelet, 1981a, p. 192).

* *Helobdella votuporanguensis*
Castro, 1971, in Siddall, 2007b

Distribution. BRA: SP (Castro, 1971, in Siddall, 2007b).

* *Helobdella wodzickiorum*
Siddall and Borda, 2004

Distribution. CHI: near Santiago: La Naturaleza Yerba Loca sanctuary (Siddall and Borda, 2004, p. 10).

* *Helobdella xenoica*
(Ringuelet, 1975)

Previous names. *Batrachobdella xenoica* Ringuelet, 1975; *Adaetobdella xenoica* (Ringuelet, 1975); *Dacnobdella xenoica* (Ringuelet, 1975).

Distribution. ARG (Ringuelet 1978a, p. 274); COL: Cundinamarca State: Zapaquirá, piscean host *Salmo irideus* (Ringuelet 1975, p. 3; Siddall, 2007a).

Discussion

Discussion on *Helobdella*

Fourty eight nominal species of *Helobdella* have been referred to in the literature for South America, most of which (43 species) have been further validated by new material being collected after the type descriptions. The known diversity of this genus has increased from 14 to 46 species in the last 27 years. Raul Adolfo Ringuelet has contributed with the largest number of new species (17 species, 35% of the known fauna). The level of endemism of *Helobdella* for South America is almost 90%. Only five species occur in more northern latitudes, attaining Central America, North America, Europe, or western Asia.

The genus *Helobdella* is considered to have originated in South America, with a hotspot of biodiversity located in Chile (Siddall and Borda, 2004, p. 2).

Discussion on South American leeches

This paper is the third and last paper of a series inventoring leech diversity

in South America. Previously, Christoffersen (2007) catalogued 25 species of Glossiphoniidae other than *Helobdella*. With the 46 species of *Helobdella* reported herein, there are now 71 known species of Glossiphoniidae catalogued for South America. Finally, Christoffersen (2008) reported the occurrence of another 66 leeches other than Glossiphoniidae for this continent. There are 139 species of leeches presently known from South America.

South American leeches were last overviewed 27 years ago (Ringuelet, 1981a). Pioneer efforts and other overviews of particular regions in South America are E. Blanchard (1849), Moore (1911), Weber (1913, 1915, 1916), Dequal (1916), Pinto (1923), Ringuelet (1936, 1960, 1976, 1985), and De Avila Goulart (1963). South American species of leeches have been divided into five groups according to their latitudinal distributions: Tropical species (0-24°); Subtropical species: (24-40°); Tropical-subtropical species (0-56°); Subtropical-temperate species (24-56°); and Temperate species (40-56°). These geographical categories are further separated into endemic and non-endemic groups. The non-endemic groups are finally distinguished as widely distributed (when occurring on both Laurasian and Gondwanan tectonic plates), possibly restricted to Gondwanan tectonic plates, or further restricted to the neotropical region (the northern neotropics including Central America, the West Indies, and southern Mexico).

Endemicity of South American leeches is high. The number of Subtropical endemics (Appendix 1) would seem to be much higher than the Tropical endemics (Appendix 2). Also when compiled by country of origin or by State in Brazil, leeches seem to predominate in subtropical and temperate latitudes (Argentina, Chile, Uruguay, Paraguay and the State of Rio Grande do Sul). Finally, leeches are noteworthy for exhibiting

distinct subtropical-temperate and temperate endemic faunas in South America (Appendix 4). However, it is difficult to decide whether this reflects true patterns or only the vagaries of sampling and place of residence of the only prolific leech specialist in South America, Raul A. Ringuelet.

The leeches known exclusively from South America (122 species) are also highly endemic (almost 88%). Leeches are ecologically quite diversified. Beyond the continental and marine forms of leeches, this group exhibits a remarkable additional scope of ecological forms of life, including ground-dwelling, ecto-commensalism, blood-feeding, and predatory life-history strategies (Siddall and Bureson, 1996, p. 278). This diversity and endemism of neotropical hirudineans, the result of limited dispersal range of the majority of species, is well known (Moore, 1911; Siddall and Borda, 2004). If and how these factors relate to such significantly higher rates of endemism may be a worthy topic for further study. The presence of terrestrial predaceous forms is a dominant feature of the South American leech fauna, virtually lacking even in Africa (Sawyer, 1986, p. 701).

Acknowledgements

I am particularly indebted to Hong-Zhu Wang, who invited me for a keynote presentation on South American clitellates at the Tenth International Symposium on Aquatic Oligochaeta in Wuhan, China (October, 2006). This paper is based in part on that presentation. I thank Claudia Berrio and Imelda Vélez for providing me with a key paper by Ringuelet. A scholarship from CNPq covered some expenses to China and other small costs involved in this project.

References

- BLANCHARD, E. 1849. Annelida. In: C.P. GAY (ed.), *Historia física y política de Chile*, según documentos adquiridos en esta república durante doce años de residencia en ella y publicada bajo las auspicios del supremo gobierno. Zoologia 3. Paris, p. 37-42.
- BLANCHARD, R. 1896. Hirudinea. Viaggio del Dr. Borelli nel Repubblica Argentina e nel Paraguay. *Bollettino del Museo di Zoologia ed Anatomia Comparata di Torino*, **11**(263):1-23.
- BLANCHARD, R. 1900. Hirudineen. *Hamburger Magalhaensische Sammelreise*, **3**:1-20.
- CASTLE, R.E. 1900. Some North American fresh-water Rhynchobdellida, and their parasites. *Bulletin of the Museum of Comparative Zoology*, **36**:39-42.
- CHRISTOFFERSEN, M.L. 2007. Clitellate evolution and leech diversity: Glossiphoniidae excl. *Helobdella* (Annelida: Hirudinea: Rhynchobdellida) from South America. *Gaia Scientia*, **1**(2):131-140.
- CHRISTOFFERSEN, M.L. 2008. A catalogue of the Piscicolidae, Ozobranchidae, and Arhynchobdellida (Annelida, Clitellata, Hirudinea) from South America. *Neotropical Biology and Conservation*, **3**(1):40-48.
- CORDERO, E.H. 1937a. Los hirudineos del nordeste del Brasil, I. Especies recogidas por Clemente Pereira en 1933 y por el autor en 1935. *Anais da Academia Brasileira de Ciências*, **9**:13-26.
- CORDERO, E.H. 1937b. Hirudineos neotropicales y subantárticos. Nuevos, críticos o ya conocidos del Museo Argentino de Ciencias Naturales. *Anales del Museo Argentino de Ciencias Naturales*, **39**:1-78.
- DAMBORENEA, C.; BRUSA, F.; PAOLA, A. 2006. Variation in worm assemblages associated with *Pomacea canaliculata* (Caenogastropoda, Ampullariidae) in sites near the Rio de la Plata estuary, Argentina. *Biocell*, **30**:457-468.
- DAMBORENEA, M.C.; GULLO, B.S. 1996. Hirudineos asociados a la cavidad paleal de *Pomacea canaliculata* (Lamarck, 1822) (Gastropoda: Ampullariidae) del balneario Bagliardi, Rio de La Plata, Argentina. *Neotropica La Plata*, **42**:97-101.
- DARRIGRAN, G.; MARTIN, S.M.; GULLO, B.; ARMENDARIZ, L. 1998. Macroinvertebrates associated with *Limnoperna fortunei* (Dunker, 1857) (Bivalvia, Mytilidae) in Rio De La Plata, Argentina. *Hydrobiologia*, **367**:223-230.
- DE AVILA GOULART, A.D. 1963. Hirudofauna do município de Pôrto Alegre (Estado do Rio Grande do Sul, Brasil) (Annelida, Hirudinea). *Iheringia Série Zoologia*, **29**:1-8.
- DE AVILA GOULART, A.D. 1967. Presença de *Helobdella obscura* Ringuelet, 1942 e *Helobdella duplicata* var. *tuberculata* Ringuelet, 1958, no Rio Grande do Sul, Brasil. *Iheringia Série Zoologia*, **35**:3-5.
- DEJOUX, C. 1992. The Triclada and Hirudinea. In: E. DEJOUX; A. ILTIS (eds.), *Lake Titicaca – A synthesis of limnological knowledge*. Kluwer, Dordrecht, The Netherlands, p. 307-310.
- DEQUAL, L. 1916. Viaggio del Dott. E. Festa nel Darien, nell Ecuador e regioni vicine. XXV, Irudinei. *Bolletino del Museo di Zoologia et Anatomia Comparata di Torino*, **31**:1-20.
- DRESSCHER, T.G.N.; ENGEL, H. 1948. Hirudinea of the genus *Helobdella* from Curaçao and Venezuela. *Studies on the Fauna of Suriname and other Guyanas*, **5**: 87-88.
- GODDARD, B.A.; MALAN, D.E. 1912. The South African Hirudinea. Part I. *Annals of the South African Museum*, **11**:307-319.
- GRUBE, A.E. 1871. Beschreibungen einiger Egelarten. *Archiv für Naturgeschichte*, **37**:87-121.
- GULLO, B.S. 1998. Hirudineos Glossiphoniidae asociados a lemnaceas, en los Talasa (Pdo. de Berisso), Buenos Aires. *Neotropica La Plata*, **44**:65-68.
- GULLO, B.S. 1999. Ovogenesis y estructura ovarica de *Helobdella hyalina* Ringuelet, 1942 (Hirudinea: Glossiphoniidae) en los Talas (Pdo. de Berisso), Buenos Aires. *Neotropica La Plata*, **45**:31-36.
- GULLO, B.S. 2001. Estructuras de la población y fecundidad de *Helobdella hyalina* (Hirudinea: Glossiphoniidae) en los Talas, Buenos Aires, Argentina. *Neotropica La Plata*, **47**:17-23.
- GULLO, B.S. 2002. Primer registro de *Helobdella diploides* Ringuelet, 1948 (Hirudinea, Glossiphoniidae) en la Argentina. *Natura Neotropicalis*, **33**:89-90.
- GULLO, B.S. 2003. Ciclo reproductivo de *Helobdella triserialis* (Hirudinea, Glossiphoniidae), Provincia de Buenos Aires, Argentina. *Revista del Museo de la Plata Sección Zoología*, **15**:1-7.
- GULLO, B.S. 2004. Histología del sistema reproductor masculino de *Helobdella hyalina* (Hirudinea, Glossiphoniidae) en Argentina. *Iheringia Série Zoologia*, **94**:13-18.
- GULLO, B.S. 2006. *Helobdella nanhuapensis* sp. nov. (Hirudinea, Glossiphoniidae), from Bariloche, Argentina. *Zootaxa*, **1276**:33-38.
- KLEMM, D.J. 1972. The leeches (Annelida: Hirudinea) of Michigan. *The Michigan Academician*, **4**:405-444.
- KUTSCHERA, U. 2004. The freshwater leech *Helobdella europaea* (Hirudinea: Glossiphoniidae): An invasive species from South America? *Lauterbornia*, **52**:153-162.
- KUTSCHERA, U.; WIRTZ, P. 2001. The evolution of parental care in freshwater leeches. *Theory in Biosciences*, **120**(2):115-137.
- MISERENDINO, M.L.; PIZZOLÓN, L.A. 2000. Macroinvertebrates of a fluvial system in Patagonia: Altitudinal zonation and functional structure. *Archiv für Hydrobiologie*, **150**:55-83.
- MOORE, J.P. 1911. Hirudinea of southern Patagonia. *Reports of the Princeton University Expedition to Patagonia 1896-1899*, **3**:669-689.
- NEGM-ELDIN, M.M.; GOVEDICH, F.R.; DAVIES, R.W. 2000. *Helobdella nilae* sp.n. (Hirudinoidea: Glossiphoniidae), from the Nile Delta, Egypt. *Hydrobiologia*, **438**:257-259.
- OCEGUERA-FIGUEROA, A. 2007. Especie nueva de sanguijuela del género *Helobdella* (Rhynchobdellida: Glossiphoniidae) del lago de

- Catemaco, Veracruz, México. *Acta Zoologica Mexicana Nueva Serie*, **23**:15-22.
- OCEGUERA-FIGUEROA, A.; LEON REGAGNON, V.; SIDDALL, M.E. 2007. Phylogenetic relationships of species of the genus *Helobdella* (Annelida: Glossiphoniidae), with particular emphasis on Mexican species. In: MEETING OF THE WILLI HENNIG SOCIETY, 26, Royal Sonesta, New Orleans, Abstracts, p. 14-15.
- OKA, A. 1930. Sur un nouveau genre d'hirudinées provenant de L'Amérique du Sud. *Proceedings of the Imperial Academy of Tokyo*, **6**:239-242.
- OKA, A. 1932. Hirudinées extra-européennes du Musée Zoologique Polonais. *Annales del Museum de Zoologie Polonici*, **9**:313-328.
- PAGGI, A.C.; OCON, C.; TANGORRA, M.; CAPITULO, A.R. 2006. Response of the zoobenthos community along the dispersion plume of a highly polluted stream in the receiving waters of a large river (Rio de la Plata, Argentina). *Hydrobiologia*, **568**:1-14.
- PAVÉ, P.J.; MARCHESE, M. 2005. Invertebrados bentónicos como indicadores de calidad del agua en ríos urbanos (Paraná-Entre Ríos, Argentina). *Ecología Austral*, **15**:183-197.
- PFEIFFER, I.B.; BRENIG, B.; KUTSCHERA, U. 2004. The occurrence of an Australian leech species (genus *Helobdella*) in German freshwater habitats as revealed by mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution*, **33**:214-219.
- PINTO, C. 1923. Ensaio monographico dos hirudíneos. *Revista do Museu Paulista*, **13**:853-1118.
- RINGUELET, R.A. 1936. Sobre una nueva especie del género *Semiscolex* Kinberg (Hirudinea). *Notas del Museo de La Plata Sección Zoología*, **1**:379-388.
- RINGUELET, R.A. 1942. Sobre dos hirudíneos del sur de Chile: *Mesobdella gemmata* (E. Bl.) y *Helobdella similis* Ring. *Physis Buenos Aires*, **19**:364-378.
- RINGUELET, R.A. 1943. Sobre la morfología y variabilidad de *Helobdella triserialis* (Em. Bl.) (Hirudinea, Glossiphoniidae). *Notas del Museo de La Plata Sección Zoología*, **8**:215-240.
- RINGUELET, R.A. 1944. Los hirudíneos argentinos de los géneros *Helobdella* R. Bl., *Batrachobdella* Vig., *Cylicobdella* Gr. y *Semiscolex* Kinb. *Revista del Museo de La Plata Sección Zoología*, **4**:5-94.
- RINGUELET, R.A. 1945. Hirudíneos del Museo de la Plata. *Revista del Museo de La Plata Sección Zoología*, **4**:95-137.
- RINGUELET, R.A. 1948. Notas sobre hirudíneos neotropicales, V: Especies de la Republica del Paraguay. *Notas del Museo de La Plata Sección Zoología*, **13**:213-244.
- RINGUELET, R.A. 1949. Notas sobre hirudíneos neotropicales. VI. Presencia del genero *Glossiphonia* en la Argentina y otras adiciones al conocimiento de la hirudofauna de los países del Plata. *Notas del Museo de La Plata Sección Zoología*, **14**:141-159.
- RINGUELET, R.A. 1953. Notas sobre hirudíneos neotropicales. VIII. Algunas especies de Bolivia y Peru. IX. Rehabilitación del género "*Cyclobdella*" Weyenbergh. *Notas del Museo Eva Perón*, **16**:215-224.
- RINGUELET, R.A. 1958. Hirudíneos del lago Argentino (Santa Cruz, Argentina) coleccionados por el Dr. A. Willink. *Acta Zoologica Lilloana*, **15**:121-141.
- RINGUELET, R.A. 1959. Una colección de hirudíneos del Perú. I. Sanguijuelas del lago Titicaca. *Physis Buenos Aires*, **21**:187-199.
- RINGUELET, R.A. 1960. Una colección de hirudíneos del Peru. I. Sanguinuelas del lago Titicaca. *Physis Buenos Aires*, **21**:187-199.
- RINGUELET, R.A. 1968. Llave o clave para el reconocimiento de las sanguijuelas conocidas de la Republica Argentina (Hirudinea) y apuntamientos sobre la hirudofauna neotrópica y transicional mexicana. *Physis Buenos Aires*, **27**:367-380.
- RINGUELET, R.A. 1972a. Alguns hirudíneos del Muséum d'Histoire Naturelle de Paris. *Physis Buenos Aires*, **31**:99-103.
- RINGUELET, R.A. 1972b. Hirudíneos neotrópicos de Colombia, Cuba y Chile con la descripción de una nueva especie de *Oligobdella* (Glossiphoniidae). *Physis Buenos Aires Sección B*, **31**(83):345-352.
- RINGUELET, R.A. 1975. Un nuevo hirudíneo de Columbia parasito de la trucha arco iris. *Neotropica*, **21**:1-4.
- RINGUELET, R.A. 1976. Clave para las familias y generos de sanguijuelas (Hirudinea) de aguas dulces y terrestres de Mesoamérica y Sudamérica. *Limnobiós*, **1**:9-19.
- RINGUELET, R.A. 1978a. Hirudíneos nuevos o ya descritos de la Argentina y del Uruguay. *Limnobiós*, **1**:258-268.
- RINGUELET, R.A. 1978b. Nuevos generos y especies de Glossiphoniidae sudamericanos basados en caracteres ecto y endosomáticos (Hirudinea, Glossiphoniiformes). *Limnobiós*, **1**:269-276.
- RINGUELET, R.A. 1981a. Hirudinea. In: S.H. HURLBERT; G. RODRIGUEZ; N.D. DOS SANTOS (eds.), *Aquatic biota of tropical South America. Being a compilation of taxonomic bibliographies for the fauna and flora of inland waters of the tropical portion of South America*. Part 2. Anarthropoda. Published by the authors, San Diego University, San Diego, California, p. 191-196.
- RINGUELET, R.A. 1981b. Some advances in the knowledge of Neotropical leeches. *Limnobiós*, **2**:226.
- RINGUELET, R.A. 1985. Sinopsis de los hirudíneos de Chile (Annelida). *Boletín de la Sociedad Biologica de Concepción*, **56**:163-179.
- SAWYER, R.T. 1971. Phylogenetic development of brooding behaviour in Hirudinea. *Hydrobiologia*, **37**:197-204.
- SAWYER, R.T. 1986. *Leech biology and behavior*. Oxford, Clarendon Press, 1.065 p.
- SAWYER, R.T.; SHELLEY, R.M. 1972. New records and species of leeches (Annelida: Hirudinea) from North and South Carolina. *Journal of Natural History*, **10**:65-97.
- SIDDALL, M.E. 2001a. Leeches of Laguna Volcan, Bolivia, including a new species of *Helobdella* (Clitellata: Hirudinea). *American Museum Novitates*, **3313**:1-12.
- SIDDALL, M.E. 2001b. Hirudinea from the Apolobamba in the Bolivian Andes, including three new species of *Helobdella* (Clitellata: Hirudinea). *American Museum Novitates*, **3341**:1-13.
- SIDDALL, M.E. 2007a. Key to the freshwater leeches of South America. Available at <http://www.library.amnh.org/~siddall/PEET/sawyer/southamerica.html>; accessed 2007/09/13.
- SIDDALL, M.E. 2007b. Descriptions of glossiphoniid leeches. Available at <http://research.amnh.org/~siddall/glossapp.html>; accessed 2007/09/13.
- SIDDALL, M.E.; BORDA, E. 2003. Phylogeny and revision of the leech genus *Helobdella* (Glossiphoniidae) based on mitochondrial gene sequences and morphological data and a special consideration of the *triserialis* complex. *Zoologica Scripta*, **32**:23-33.
- SIDDALL, M.E.; BORDA, E. 2004. Leech collections from Chile including two new species of *Helobdella* (Annelida: Hirudinea). *American Museum Novitates*, **3457**:1-18.
- SIDDALL, M.E.; BUDINOFF, R.B. 2005. DNA-barcoding evidence for widespread introductions of a leech from the South American *Helobdella triserialis* complex. *Conservation Genetics*, **6**:467-472.
- SIDDALL, M.E.; BUDINOFF, R.B.; BORDA, E. 2005. Phylogenetic evaluation of systematics and biogeography of the leech family Glossiphoniidae. *Invertebrate Systematics*, **19**:105-112.
- SIDDALL, M.E.; BURRESON, E.M. 1996. Leeches (Oligochaeta?: Euhirudinea), their phylogeny and the evolution of life-history strategies. *Hydrobiologia*, **334**:277-285.
- VEGA, I.A.; DAMBORENEA, M.C.; GAMARRA-LUQUES, C.; KOCH, E.; CUETO, J.A.; CASTRO-VAZQUEZ, A. 2006. Facultative and obligate symbiotic associations of *Pomacea canaliculata* (Caenogastropoda, Ampullariidae). *Biocell*, **30**:367-375.
- WEBER, M. 1913. Hirudinées columbiennes. In: O. FUHRMANN; E. MAYOR (eds.), *Voyage d'Exploration scientifique en Colombie*. Memories de la Société Neuchâtoise des Sciences Naturelles. Neuchatel, France, Attinger Frères, p. 731-747.
- WEBER, M. 1915. *Monographie des hirudinées sudaméricaines*. Neuchatel, France, Attinger Frères, 134 p.
- WEBER, M. 1916. Hirudinées Péruviennes. *Zoologischer Anzeiger*, **48**:115-122.

Submitted on May 27, 2008.

Accepted on April 13, 2009.

Appendix 1. List of endemic Subtropical species of leeches from South America (52 species).

AMERICOBDELLIDAE

Americobdella valdiviana (De Philippi, 1872)

CYCLOBDELLIDAE

Orchibdella diaguita Ringuelet, 1978

Orchibdella pampeana Ringuelet, 1945

GLOSSIPHONIIDAE

Albinoglossiphonia mesembrina (Ringuelet, 1949)

Haementeria bonaerensis MacDonagh, 1928

Haementeria brasiliensis (Weber, 1915)

Haementeria eichhornia Ringuelet, 1978

Haementeria gracilis (Weyenbergh, 1883)

Haementeria laevis (Weber, 1915)

Haementeria molesta Cordero, 1937

Helobdella ampullariae Ringuelet, 1945

Helobdella araucana Ringuelet, 1978

Helobdella brasiliensis (Weber, 1915)

Helobdella budgei (Grube, 1871)

Helobdella chaquensis (Ringuelet, 1978)

Helobdella chilensis R. Blanchard, 1900

Helobdella columbiensis (Ringuelet, 1975)

Helobdella cordobensis (Ringuelet, 1943)

Helobdella diploides Ringuelet, 1948

Helobdella dubia (Ringuelet, 1958)

Helobdella duplicata aplacophora Ringuelet, 1958

Helobdella duplicata tuberculata Ringuelet, 1958

Helobdella gemmata R. Blanchard, 1900

Helobdella longicollis Weber, 1915

Helobdella luteopunctata (Apáthy, 1905, in Weber, 1915)

Helobdella nauehuapensis Gullo, 2006

Helobdella paranensis (Oka, 1930)

Helobdella pichipanan Siddall and Borda, 2004

Helobdella ringueleti Siddall, 2001

Helobdella striata Ringuelet, 1942

Helobdella trituberculata (Weber, 1915)

Helobdella votuporanguensis Castro, 1971

Helobdella wodzickiorum Siddall and Borda, 2004

Maiabdella batracophila Ringuelet, 1980

Placobdella chelonae (Ringuelet, 1978)

Placobdella columbiensis (Ringuelet, 1972)

MACROBDELLIDAE

Oxytychus inexpectatus Ringuelet, 1945

Oxytychus ornatus (Weyenbergh, 1883)

Oxytychus strenuous Ringuelet, 1948

PISCICOLIDAE

Branchelion gnesios Ringuelet, 1985

Branchelion ravenelii (Giard, 1851)

Myzobdella platense (Cordero, 1933)

Myzobdella uruguayensis Mané-Garzón and Monteiro, 1977

Platybdella chilensis Moore, 1910

Stibarobdella dispar (Cordero, 1937)

Stibarobdella loricata (Harding, 1937)

Stibarobdella macrothela (Schmarda, 1861)

Tracheobdella mulleri Diesing, 1850

SEMISCOLECIDAE

Semiscolex coecus Ringuelet, 1953

Semiscolex intermedius Ringuelet, 1942

Semiscolex juvenilis Kinberg, 1866

XEROBDELLIDAE

Mesobdella notohilica Ringuelet, 1953

Nesophilaemon skottsbergi (Johansson, 1924)

Appendix 2. List of endemic Tropical species of leeches from South America (36 species).

CYCLOBDELLIDAE

Orchibdella peruviansis Ringuelet, 1976

CYLICOBDELLIDAE

Blanchardiella adaiophthalma Ringuelet, 1980

Blanchardiella cameliae Weber, 1913

Blanchardiella columbiensis (Weber, 1913)

Blanchardiella ecuadoriensis Dequal, 1916

Blanchardiella festai Dequal, 1916

Blanchardiella fuhrmanni (Weber, 1913)

Blanchardiella octoculata Weber, 1913

Blanchardiella paramoensis Weber, 1913

Blanchardiella peruana Ringuelet, 1960

Blanchardiella tamboensis Weber, 1913

Cylicobdella lumbricoides Grube, 1871

ERPOBDELLIDAE

Lumbricobdella chamensis Dequal, 1917

GLOSSIPHONIIDAE

Haementeria ghiliani De Philippi, 1849

Haementeria helleri (Weber, 1915)

Haementeria steineri Hotz-Bolinger, 1981

Helobdella bolivianita Siddall, 2001

Helobdella festae (Dequal, 1916)

Helobdella godelti Weber, 1916

Helobdella hemispherica Weber, 1913

Helobdella huaroni Weber, 1916

Helobdella nununujensis Siddall, 2001

Helobdella peruviansis Weber, 1916

Helobdella sorochi Siddall, 2001

Helobdella titicacensis Ringuelet, 1959

Helobdella villarsi Weber, 1916

Placobdella bistriata (Pinto, 1920)

Placobdella brasiliensis (Cordero, 1937)

Placobdella columbiensis (Ringuelet, 1972)

Tribothrynobdella andicola Ringuelet, 1976

OZOBANCHIDAE

Bogabdella ringueleti (Mané-Garzón, 1973)

Unoculubranchiobdella expansa Solano Lobo Peralta, Rodrigues

Matos and Maués Serra-Freire, 1998

PISCICOLIDAE

Bathybdella sawyeri Bureson, 1981

SEMISCOLECIDAE

Semiscolex notatus Cordero, 1937

Semiscolex similis (Weyenbergh, 1877)

XEROBDELLIDAE

Diestecostoma trujillensis Ringuelet, 1976

Appendix 3. List of endemic Tropical-subtropical species of leeches from South America (20 species).

CYLICOBDELLIDAE

Cylicobdella intermedium (Nonato, 1946)

Cylicobdella joseense (Grube and Örsted, 1859)

ERPOBDELLIDAE

Erpobdella wuttkei Kutschera, 2004

GLOSSIPHONIIDAE

Haementeria depressa (E. Blanchard, 1849)
Haementeria lutzi Pinto, 1920
Haementeria maculata (Weber, 1915)
Haementeria paraguayensis (Weber, 1915)
Helobdella cryptica Ringuelet, 1978
Helobdella duplicata duplicata (Moore, 1911)
Helobdella elongata Castle, 1900
Helobdella michaelsoni R. Blanchard, 1900
Helobdella obscura (Ringuelet, 1942)
Helobdella scutifera R. Blanchard, 1900

Helobdella simplex Moore, 1911
Helobdella xenoica (Ringuelet, 1975)
Theromyzon propinquum (Ringuelet, 1947)
 MACROBDELLIDAE
Oxytychus brasiliensis (Pinto, 1920)
Oxytychus striatus Grube, 1851
 SEMISCOLECIDAE
Semiscolex glaber (Weyenbergh, 1877)
Semiscolex zonatus Oka, 1931

Appendix 4. List of endemic Temperate and Subtropical-temperate species of leeches from South America (13 species).

Temperate species:

ERPOBDELLIDAE
Erpobdella dubia (Ringuelet, 1958)
 GLOSSOPHONIIDAE
Haementeria dissimilis Cordero, 1937
Helobdella malvinensis (Ringuelet, 1978)
 PISCICOLIDAE
Platybdella tentaculata (Cordero, 1937)
Pontobdella variegata Baird, 1859
Pontobdella zonata Apáthy, 1905 in Weber, 1915
Stibarobdella planodiscus Baird, 1859
Tracheobdella australis R. Blanchard, 1900

Subtropical-temperate species:

GLOSSOPHONIIDAE
Helobdella hyalina Ringuelet, 1942
 SEMISCOLECIDAE
Patagoniobdella ademonia Ringuelet, 1976
Patagoniobdella fraterna Ringuelet, 1976
Patagoniobdella variabilis (R. Blanchard, 1900)
 XEROBDELLIDAE
Mesobdella gemmata (E. Blanchard, 1849)

Appendix 5. List of non-endemic widely distributed species of leeches from South America (10 species).

Species with Tropical-subtropical ranges in South America:

GLOSSOPHONIIDAE
Helobdella europaea Kutschera, 1987
Helobdella lineata (Verrill, 1874)
Helobdella stagnalis (Linnaeus, 1758)
Helobdella triserialis (E. Blanchard, 1849)
 SALIFIDAE
Barbronia weberi (R. Blanchard, 1897)

Species with Subtropical ranges in South America:

HIRUDINIDAE
Hirudo medicinalis Linnaeus, 1758
 OZOBRANCHIDAE
Ozobranchus margo (Apáthy, 1890)
 PISCICOLIDAE
Branchellion lobata Moore, 1952
Johanssonia arctica (Johansson, 1898)

Species with Tropical ranges in South America:

GLOSSOPHONIIDAE
Haementeria officinalis De Philippi, 1849

Appendix 6. List of non-endemic northern neotropic species of leeches from South America (5 species).

Species with Tropical ranges in South America:

CYLIBDELLIDAE
Blanchardiella biolleyi Dequal, 1916
Cylicobdella coccineum (Wagler, 1831)

Species with Tropical-subtropical ranges in South America:

GLOSSOPHONIIDAE
Haementeria tuberculifera (Grube, 1871)
Theromyzon tessellatum (O. F. Müller, 1774)
 MACROBDELLIDAE
Limnobdella mexicana (R. Blanchard, 1893)

Appendix 7. List of non-endemic, possibly Gondwanan, species of leeches from South America (3 species).

Species with Tropical-subtropical ranges in South America:

GLOSSOPHONIIDAE
Helobdella adistola Ringuelet, 1972

Species with Temperate ranges in South America:

PISCICOLIDAE
Platybdella patagonica Ringuelet, 1945

Species with Subtropical ranges in South America:

PISCICOLIDAE
Branchellion parkeri Richardson, 1949