A synopsis of the South American *Hydrovatus* (Coleoptera: Dytiscidae: Hydroporinae), with notes on habitat and distribution, and a key to species

TRÉMOUILLES Edgardo R.[*], Mariano C. MICHAT[**] and Patricia L. M. TORRES[**]

[*]Museo Argentino de Ciencias Naturales 'Bernardino Rivadavia'. Av. Ángel Gallardo 470, C1405DJR, Buenos Aires, Argentina; CONICET; e-mail: edgtrem@macn.gov.ar

[**]Laboratorio de Entomología, Departamento de Biodiversidad y Biología Experimental, Fac. de Cs. Exactas y Naturales, Univ. de Buenos Aires. Av. Intendente Güiraldes s/n, C1428EHA, Buenos Aires, Argentina; CONICET; e-mail: marianoide@bg.fcen.uba.ar

■ **ABSTRACT.** We revised the South American members of the genus *Hydrovatus* Motschulsky. Each of the three recognized species is diagnosed, with emphasis on diagnostic characters. A key summarizing the main differences is provided. To identify South American specimens of *H. caraibus* Sharp, they were compared with Central American specimens, including type material. Based on the material examined, *H. caraibus* is a species broadly distributed in Central and South America, with representatives of different areas separated by minor differences. The geographical distributions of the three species are considerably enlarged: *H. crassulus* Sharp and *H. turbinatus* Zimmermann are recorded for the first time from Paraguay, and *H. caraibus* is recorded for the first time from Argentina and Nicaragua. Bionomical information of the species is presented.

KEY WORDS. Aquatic beetles. Dytiscidae. Hydrovatini. Neotropical Region. Argentina.

■ **RESUMEN. Sinopsis de los *Hydrovatus* sudamericanos (Coleoptera: Dytiscidae: Hydroporinae), con notas sobre hábitat y distribución, y una clave para las especies.** Se estudiaron los representantes sudamericanos del género *Hydrovatus* Motschulsky. Se diagnostica cada una de las tres especies conocidas, enfatizando el reconocimiento de caracteres valiosos para su identificación; las principales diferencias se resumen en una clave. Para identificar los ejemplares sudamericanos de *H. caraibus* Sharp, se los comparó con especímenes de América Central, incluyendo material tipo. En base al material examinado, *H. caraibus* se encuentra ampliamente distribuida en America Central y del Sur, con representantes de diferentes áreas separados por diferencias menores. Las distribuciones geográficas de las tres especies se amplían considerablemente: *H. crassulus* Sharp y *H. turbinatus* Zimmermann se citan por primera vez de Paraguay, y *H. caraibus* se cita por primera vez de Argentina y Nicaragua. Se presenta información bionómica de las especies.

PALABRAS CLAVE. Coleópteros acuáticos. Dytiscidae. Hydrovatini. Región Neotropical. Argentina.

INTRODUCTION

The diving-beetle genus *Hydrovatus* Motschulsky 1853 includes small-sized Dytiscidae which, along with the members of the Neotropical genus *Queda* Sharp (see Biström, 1990; Trémouilles *et al.*, 2004), make up the Hydroporine tribe Hydrovatini. The genus has a Pantropical distribution, with some species also occurring in the subtropics and temperate areas. Young (1963) treated the genus in North America, and Biström (1996), in an extensive revision of the *Hydrovatus* of the world, recognized tentatively an overall of 202 species. Biström (1996) subdivided the genus into 15 groups of species based on both external and internal characters (chiefly male genitalia). Even though Biström's classification should be considered as preliminary, the analysis of the male genitalia proves to be useful in determining subgroups and identifying species within a genus with a very homogeneous external appearance.

In South America, two species of *Hydrovatus* are recognized with certitude. Zimmermann (1921) described *H. turbinatus* Zimmermann from Argentina, quoting Buenos Aires Province as locality, without specifying the exact place where the specimens had been collected. No subsequent information on the geographical distribution, nor any data on the biology of this species, were published. Sharp (1882) described *H. crassulus* Sharp from Brazil. The geographical distribution of this species also includes Argentina, Ecuador and, with doubt, Venezuela (Zimmermann, 1920; Biström, 1996). Another species, *H. caraibus* Sharp 1882 from the Caribbean Isles, was mentioned by Biström (1996) from South America (Colombia, Venezuela, Guyana, Brazil, and Paraguay). However, he pointed out the smaller size of the specimens he examined, and considered dubious their placement in *H. caraibus*. Later on, this species was recorded in a faunistic list from southern Brazil (Benetti *et al.*, 2003). *H. caraibus* and the North and Central American species *H. davidis* Young and *H. sharpi* van den Branden are very closely related, and were considered a species complex by Biström (1996), belonging to the *H. pustulatus* (Melsheimer) species-group.

In this paper, we present a synopsis of the three species of *Hydrovatus* recognized from South America, all of which are recorded for Argentina (*H. caraibus* is herein first reported). A diagnosis of each species is presented, with emphasis on the recognition of useful diagnostic characters, and a key summarizing the main differences is provided. To determine South American specimens as *H. caraibus*, they were compared with Central American specimens including the type series. Intraspecific variations in color and punctation of *H. caraibus* are described. Distributional information, as well as data on their biology, are also provided for all three species.

MATERIAL AND METHODS

Measurements of total body length and maximum width of the specimens, as well as external observation, description, and drawings of the habitus, were made using a Zeiss stereoscopic microscope equipped with camera lucida. For the study of the male genitalia, these parts were dissected and mounted on standard glass slides with Hoyer's medium. Observation (at magnifications up to 400x) and drawings were made using an Olympus CH30 compound microscope equipped with camera lucida. Illustrations were scanned and edited using a computer.

Material of different species was obtained on loan from the following institutions: Natural History Museum, London, UK (NHM); Museum für Naturkunde der Humboldt Universität, Berlin, Germany (MNHU); Fundación e Instituto Miguel Lillo, Tucumán, Argentina (FIML); Museo Argentino de Ciencias Naturales, Buenos Aires, Argentina (MACN).

RESULTS

Hydrovatus turbinatus Zimmermann,1921
(Figs. 3-5, 8, 12, 15)

Hydrovatus turbinatus Zimmermann, 1921: 191; Bruch, 1927: 541; Blackwelder, 1944: 75; Trémouilles, 1995: 37; Trémouilles *et al.*, 1995: 1163; Biström, 1996: 97, 133; Trémouilles, 1998: 216; Nilsson, 2001: 201; Bachmann, 2003: 65.

Diagnosis. This is a very characteristic species, distinguished by its small size and globular body

(Fig. 3): total length 1.85-2.00 mm, maximum width 1.30-1.35 mm, ratio total length/maximum width 1.41-1.48 (n = 12). Dorsal coloration yellowish-testaceous. Punctation on pronotum and elytra coarse and densely distributed. Males of *H. turbinatus* have a character that is unique within the genus: the mesotarsal claws are strongly asymmetrical because one of them is distinctly extended (Fig. 4). The male genitalia are also characteristic: the median lobe is distinctly broad in dorsal aspect (Fig. 8), the distal portion is short; the apex (lateral aspect) is straight (Fig. 5). The parameres are pilose on ventral margin, and bear a blade-like apical process (Fig. 12).

Distribution. Argentina (Buenos Aires, Corrientes, and Salta Provinces), Paraguay (new country record) (Fig. 15).

Biology. Specimens from Corrientes Province (Argentina) were collected in association with floating vegetation (*Eichhornia azurea* Kunth and *Ludwigia* sp.). One specimen was collected in Buenos Aires City, at the Ecological Reserve 'Costanera Sur', from a large semipermanent pond (about 800 m long and 20-30 m wide) with a dense cover of floating vegetation (*Lemna* sp., *Wolffia* sp., *Wolffiella* sp., *Limnobium* sp., *Pistia stratiotes* (Linné), *Salvinia* sp., and *Azolla filiculoides* Lamarck). On the same sampling, other ditiscids and noterids (adults and larvae of *Hydrocanthus* sp. and *Celina* sp., and adults of *Brachyvatus acuminatus* (Steinheil) were also collected. A survey carried out in the period 1999-2001 (unpublished data) revealed that adults of Noteridae (*Suphisellus* sp.), Hydrophilidae (*Derallus paranensis* Oliva, *Tropisternus ignoratus* Knisch), Belostomatidae (*Belostoma elegans* (Mayr), *B. oxyurum* (Dufour)), Naucoridae (*Pelocoris binotulatus nigriculus* Berg) and Pleidae (*Neoplea maculosa* (Berg)), as well as larvae of Diptera (Muscidae, Psychodidae, Stratiomyidae, Culicidae) and Odonata (Aeshnidae) were typical inhabitants of this pond.

Material examined. ARGENTINA. Buenos Aires: 1 ex., *Syntype*, Prov. Buenos Aires, 9-VII-1905, col. C. Bruch (MACN). 3 exx., same label data (MACN). 1 male, Capital Federal, Reserva Ecológica Costanera Sur, II-2001, col. Torres-Michat (MACN). **Corrientes:** 9 exx., Ruta 5 km 2, Charca de los Gitanos, 3-XII-82 (MACN). **Salta:** 1 male, Martínez del Tineo, 17-XII-1981, col. Fidalgo-Domínguez (FIML). **PARAGUAY. Dpto. Concepción:** 1 male, Vallemí, 25-VI-1952, col. Bachmann (MACN).

Hydrovatus crassulus Sharp 1882
(Figs. 1, 6, 9, 11, 13, 15)

Hydrovatus crassulus Sharp, 1882: 330; van den Branden, 1885: 26; Régimbart, 1899: 2; Bruch, 1915: 474; Zimmermann, 1920: 32; 1921: 191; 1925: 2; Bruch, 1927: 541; Blackwelder, 1944: 75; Young, 1963: 188; Trémouilles, 1995: 37; Trémouilles *et al.*, 1995: 1163; Biström, 1996: 97, 129; Trémouilles, 1998: 216; Nilsson, 2001: 199.

Diagnosis. This species is characterized by its body shape, globular to slightly elongate (Fig. 1): total length 2.07-2.20 mm, maximum width 1.35-1.45 mm, ratio total length/maximum width 1.47-1.56 (n = 7). Dorsal coloration reddish-testaceous. Punctation on pronotum and elytra fine and rather sparsely distributed. The male genitalia are characteristic: the median lobe is broad in dorsal aspect (Fig. 9) and has, at midlength, several pointed processes projecting backwards (Figs. 6 and 9), the distal portion is short; the apex (lateral aspect) is curved downwards (Fig. 6). The parameres are broad, pilose on the ventral margin, with the apex broadly rounded (Fig. 13), and bear a spiniform apicoventral process on the inner surface (Fig. 11).

Distribution. Brazil, Ecuador, Venezuela?, Argentina (Entre Ríos and Chaco Provinces), Paraguay (new country record) (Fig. 15).

Material examined. ARGENTINA. Chaco: 2 females, Resistencia, 12-XI-1950, col. Monrós-Willink (FIML). **BRAZIL:** 4 exx., Mato-Grosso, Corumbá (MNHU). 1 female, Mato-Grosso, Corumbá, col. C. Bruch (MACN). **PARAGUAY. Dpto. Presidente Hayes:** 3 exx., Puerto Galileo, 23-II-2003, col. O. R. Di Iorio (MACN). **Dpto. Alto Paraguay:** 1 male, Fortín Patria, 3-XII-2002, col. O. R. Di Iorio (MACN).

Hydrovatus caraibus Sharp 1882
(Figs. 2, 7, 10, 14-15)

Hydrovatus caraibus Sharp, 1882: 325; van den Branden, 1885: 25; Zimmermann, 1920: 32; Blackwelder, 1944: 75; Spangler, 1981: 151; Biström, 1996: 100, 144; Nilsson, 2001: 200; Benetti *et al.*, 2003: 40.

***Diagnosis*.** This species is distinguished by its large size and body shape globular to slightly elongate (Fig. 2): total length 2.37-2.70 mm, maximum width 1.45-1.60 mm, ratio total length/ maximum width 1.46-1.59 (n = 19). Dorsal coloration variable, from predominantly reddish to yellowish-testaceous or reddish-brown. Both coarse and somewhat finer punctures on pronotum and elytra, rather densely and irregularly distributed. The male genitalia characterize this species: the median lobe is narrow in dorsal view, with the distal portion long (Fig. 10); the apex (lateral aspect) is curved downwards (Fig. 7). The parameres are glabrous; the apex has a small membranous area (Fig. 14).

***Note*.** This species is closely related to the North American species *H. davidis* and *H. sharpi*. Biström (1996) considered them a species complex.

***Intraspecific variations*.** South American specimens, collected at different localities from Argentina and Paraguay, and some specimens from Central America that we have seen, show variations in coloration, punctation, or both with respect to the holotype. Specimens from Puerto Galileo (Paraguay) are very similar to each other, the general coloration being yellowish-testaceous to reddish-brown. A brief description of the coloration of Puerto Galileo specimens is herein provided: head dark-reddish to testaceous, pale-reddish to testaceous near anterior margin of clypeus. Antennae, maxillary and labial palpi testaceous to reddish-testaceous. Pronotum reddish-testaceous to dark-reddish, sides yellowish-testaceous, diffusely delimited. Elytra reddish-brown, except for a narrow yellowish-testaceous area on external margin, broader in apical portion. Epipleurae pale-yellowish, margins dark. Ventral side of thoracic parts reddish-brown except for dark metacoxae and margins of metasternum. Abdomen dark-reddish to reddish-brown, with dark areas between sternites. Legs yellowish-testaceous to reddish-testaceous, metatarsites dark on distal portion. Specimens from Nicaragua, and different parts of Argentina and Paraguay, show a coloration similar to that of the specimens from Puerto Galileo; some individuals, however, have a slightly more reddish general color. Specimens from Carumbé (Paraguay) exhibit a coloration intermediate between that of the holotype and the remaining South American specimens, though it is closer to that of the type (predominantly reddish). Finally, one specimen from Georgetown (Guiana), which is probably teneral, shows a general reddish coloration, but is somewhat paler on head and pronotum. Some Central American specimens have a punctation similar to that of the holotype (coarse and dense), but others exhibit finer and somewhat sparsely distributed punctures. This individual variation was also observed in South American specimens. No remarkable differences in size were observed among Central and South American specimens. The total length of Central American specimens (including the holotype) ranges from 2.40 to 2.70 mm (n = 5), while in South American ones it ranges from 2.37 to 2.60 mm (n = 15).

***Distribution*.** Cuba, Jamaica, Dominican Republic, Puerto Rico, Guadeloupe, Brazil, Paraguay, Guiana, Colombia?, Venezuela?. New country records: Nicaragua, Argentina (Buenos Aires, Entre Ríos, Corrientes, Jujuy, Formosa and Chaco Provinces) (Fig. 15).

***Biology*.** Argentina: specimens from Corrientes Province were collected in association with floating vegetation (*Eichhornia azurea* and *Ludwigia* sp.). Specimens from Salta Province were captured in a deep permanent pond (about 35 m long), among littoral vegetation. This pond contained a very diverse fauna of aquatic Coleoptera, other insects and small fish. Specimens from Entre Ríos Province ('El Palmar' National Park) came from a shallow semipermanent water body, densely vegetated, containing many aquatic insects, crustaceans and small fish. Specimens from Chaco Province were collected from a long canal with a dense cover of *Pistia stratiotes*. Two specimens from Carumbé (Paraguay) were apparently collected from a «cacique» nest (Icteridae: *Cacicus*) ('nido de boyero'). This bird nests near water; the nest has the shape of an elongate bag, composed of a fine mesh of plant fibres.

Material examined. GUADELOUPE. *Holotype*, female, Guadeloupe, Wehncke, Sharp Coll 1905-313 (NHM). **ARGENTINA. Buenos Aires:** 1 ex., 1 male, 1 female, 9-VII-1905, col. C. Bruch (MACN). **Entre Ríos:** 2 exx., P.N. El Palmar, 27-02-04, Bañado de los Carpinchos, col. Torres-Michat (MACN). 1 female, Concordia, col. Daguerre (MACN). Corrientes: 9 exx., Ruta 5 km 2, 3-XII-82, Charca de los Gitanos (MACN). **Formosa:** 1 male, 1 female, La Herradura, 18-III-1975, col. A. O. Bachmann (MACN). **Chaco:** 1 ex., P.N. Chaco, 27-II-2004, Laguna Panza de Cabra, col. Compagnucci (MACN). **Jujuy:** 2 exx., P.N. Calilegua, 16-XI-2003, laguna aprox. 600 msnm, col. Torres-Michat (MACN). **BRITISH GUIANA.** 1

ex., Georgetown, Ag. Col., Bot. Garden. 28.VIII.1959, E.J. Pearce (NHM). **CUBA.** 1 female (MNHU). **NICARAGUA.** 3 exx., Río San Juan, Los Guatuzos, 18-X-03, leg J. M. Maes (MACN). **PARAGUAY. Dpto. Alto Paraguay:** 1 ex., Fortín Patria, 3-XII-2002, col. O. R. Di Iorio (MACN). **Dpto. Presidente Hayes:** 33 exx., Puerto Galileo, 23-II-2003, col. O. R. Di Iorio (MACN). **Dpto. Canindeyú:** 12 exx., Reserva Natural de Mbaracayú, Aguará-ñú, 15-XII-2003, col. O. R. Di Iorio (MACN); 5 exx., same label but Jejuí-mí, 18-19-XII-2003 (MACN). **Dpto. San Pedro:** 5 exx., Carumbé, I-1971, col. R. Golbach (FIML); 12 exx., same label but 28-I-10-III-1965 (FIML). **PUERTO RICO.** 1 female, 1 male, «Portorico» (MNHU). **UNCERTAIN COUNTRY.** 1 male (MNHU).

Key to the species of South American *Hydrovatus* Motschulsky

The South American species of *Hydrovatus* are quite different from one another; Biström (1996) placed each of them in a distinct species group. However, within each species, both sexes are very similar to each other in size and external appearance, to such a point that it is difficult to establish with certainty the sex of an individual without dissecting the genitalia. An exception to this rule is *H. turbinatus*, in which the males have a strong dimorphism in the mesotarsal claws; in the females these claws are equal. A useful method for determining the sex of an individual, without dissecting it, is to put the specimen in ventral aspect and see (under stereomicroscope) through the two last sternites. The strongly sclerotised gonocoxae of females are slightly visible, in transparence, as a longitudinal band.

In the following key, characters of size and punctation can be applied to both sexes, while the rest are characters from males:

1. Smaller species (total length < 2.30 mm). Median lobe broad in dorsal aspect, distal portion short (Figs. 8-9). Parameres pilose on ventral margin, with apical process, without a small membranous apical area (Figs. 11-13).....2

1'. Larger species (total length > 2.30 mm). Median lobe narrow in dorsal aspect, distal portion long (Fig. 10). Parameres glabrous, without apical process, with a small membranous apical area (Fig. 14).....***H. caraibus*** Sharp

2. Body globular to slightly elongate (Fig. 1). Punctation on pronotum and elytra fine and rather sparsely distributed. Apex of median lobe (lateral aspect) curved downwards (Fig. 6). Parameres with a spiniform apicoventral process on inner surface (Fig. 11). Male mesotarsal claws equal.....***H. crassulus*** Sharp

2'. Body globular (Fig. 3). Punctation on pronotum and elytra coarse and densely distributed. Apex of median lobe (lateral aspect) straight (Fig. 5). Parameres with a blade-like apical process (Fig. 12). Male mesotarsal claws strongly asymmetric, one of them distinctly extended (Fig. 4).....***H. turbinatus*** Zimmermann

DISCUSSION

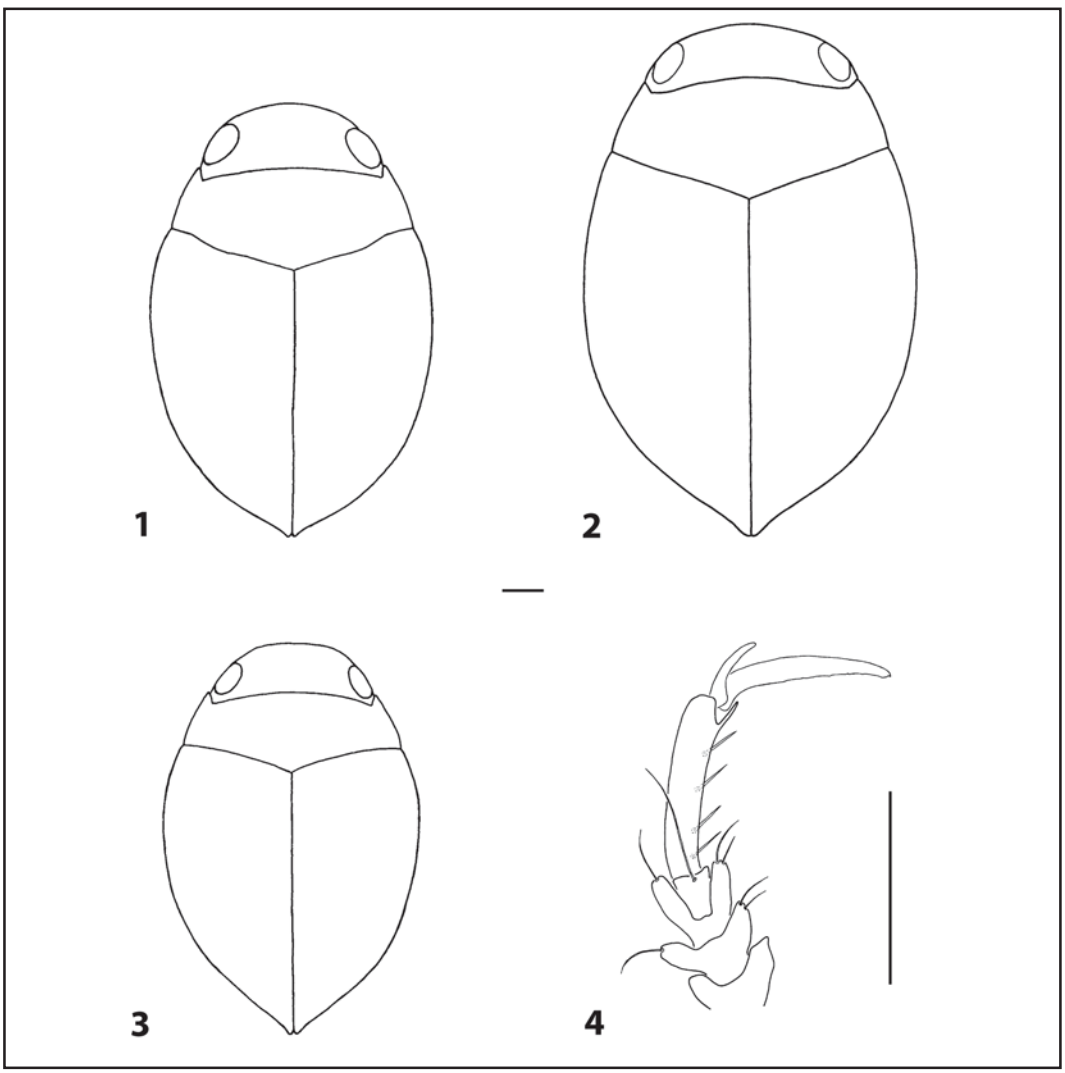
H. caraibus is a species widely distributed in Central and South America, the southern limit being Buenos Aires Province (Argentina). Specimens from different parts of its distributional range differ little or not at all regarding male genitalia. However, as pointed above, individuals show regional differences in the coloration and punctation. We consider these differences of minor importance and not sufficient to separate them as distinct species. Interestingly, we have observed that specimens mounted many years ago tend to have a more reddish coloration, and fresh material has rather a testaceous to brownish color. Differences in coloration among individuals may possible be due to the passing of time. Although Biström (1996) stated that South American specimens of *H. caraibus* are somewhat smaller than those from the West Indies, our study of specimens from both areas does not reveal remarkable differences in size. Future studies, including abundant material of different localities, may help in finding some constant differences among populations.

The geographical distributions of *H. crassulus*, *H. turbinatus* and *H. caraibus* are considerably enlarged in this paper (Fig. 15). They are recorded for the first time from Paraguay, and *H. turbinatus* is also recorded from the northern provinces of Argentina, which are the first records for the species

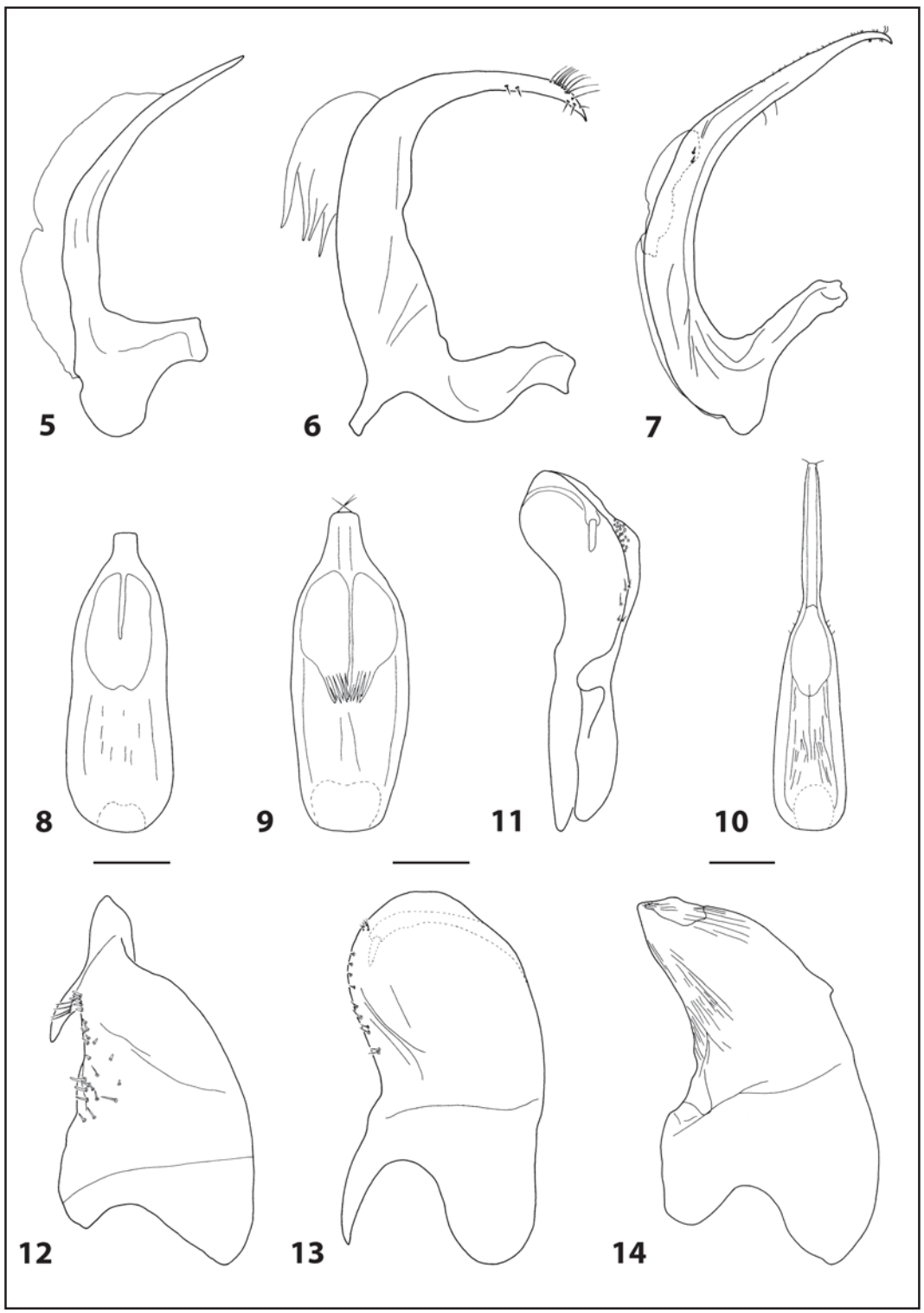
other than the type locality (Buenos Aires). *H. crassulus* is also recorded from Chaco Province (Argentina). *H. caraibus* is cited for the first time from Argentina and Nicaragua.

ACKNOWLEDGMENTS

We want to thank several people for the loan of valuable material for this study: Dr. M. Uhlig and B. Jaeger (MNHU), Miss C. Taylor (NHM), and Mr. F. Sanchez (FIML). Dr. O. R. Di Iorio generously gave us several specimens from Paraguay (Project Par 98/G/33 - Guyra Paraguay), and the authorities of the Reserva Ecológica Costanera Sur kindly permitted our sampling. Dr. J. Navas (MACN) provided useful information about the «cacique». Special thanks to Dr. A. O. Bachmann and Dr. M. Archangelsky for the critical review of the manuscript and valuable comments. Laboratory work for M. C. Michat and P. L. M. Torres was supported by postgraduate scholarships and grant PIP 02541/00 from the Consejo Nacional de Investigaciones Científicas y Técnicas de la República Argentina (CONICET).



Figs. 1-4. 1-3, Outline of the habitus, dorsal aspect: 1, *Hydrovatus crassulus*; 2, *H. caraibus*; 3, *H. turbinatus*. 4, *H. turbinatus*, male mesotarsal claws, lateral aspect. Scale bars = 0.20 mm.



Figs. 5-14. 5-7, Median lobe, lateral aspect: 5, *Hydrovatus turbinatus*; 6, *H. crassulus*; 7, *H. caraibus*, male from Puerto Galileo, Paraguay. 8-10, Median lobe, dorsal aspect: 8, *H. turbinatus*; 9, *H. crassulus*; 10, *H. caraibus*, male from Puerto Galileo, Paraguay. 11, *H. crassulus*, left paramere, lateroventral aspect. 12-14, Left paramere, lateral aspect: 12, *H. turbinatus*; 13, *H. crassulus*; 14, *H. caraibus*, male from Puerto Galileo, Paraguay. Scale bars = 0.10 mm.

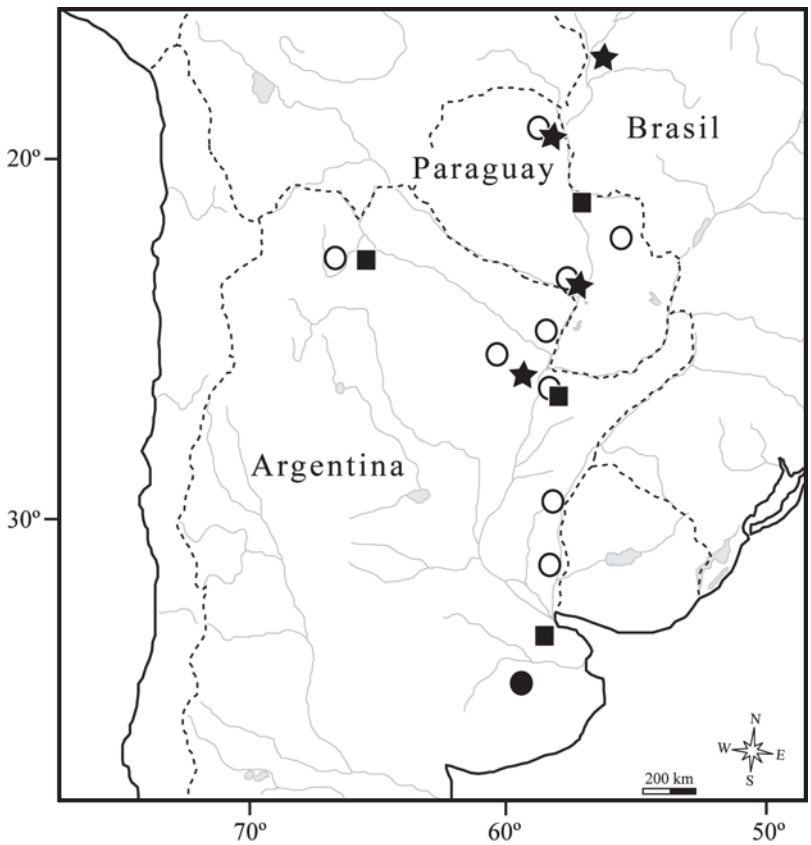


Fig. 15. Distribution of the species of *Hydrovatus* in southern South America: star = *H. crassulus*, square = *H. turbinatus*, circle = *H. caraibus* (dot = province record only).

LITERATURE CITED

BACHMANN, A. O. 2003. A catalog of the types of Gyrinidae, Haliplidae, Noteridae, Dytiscidae, Limnichidae, Elmidae, Dryopidae, Heteroceridae and Scirtidae (Insecta, Coleoptera) deposited in the Museo Argentino de Ciencias Naturales, Buenos Aires. *Rev. Mus. Argent. Cienc. Nat., n.s.* 5: 63-71.

BENETTI, C. J., J. A. RÉGIL CUETO & J. GARRIDO GONZÁLEZ. 2003. Estudio faunístico de Hydradephaga (Coleoptera: Dytiscidae, Gyrinidae, Haliplidae, Noteridae) en el municipio de Gramado, sur de Brasil. *Bol. Soc. Ent. Aragonesa* 32: 37-44.

BISTRÖM, O. 1990. Revision of the genus *Queda* Sharp (Coleoptera, Dytiscidae). *Quaest. Entom.* 26: 211-220.

BISTRÖM, O. 1996. Taxonomic Revision of the genus *Hydrovatus* Motschulsky (Coleoptera, Dytiscidae). *Entom. Basil.* 19: 57-584.

BLACKWELDER, R. E. 1944. Checklist of the coleopterous insects of Mexico, Central America, the West Indies, and South America. Part I. *Bull. U. S. Nation. Mus.* 185(1): 1-188.

BRANDEN, C. van den. 1885. Catalogue des coléoptères carnassiers aquatiques (Haliplidae, Amphizoidae, Pelobiidae et Dytiscidae). *Ann. Soc. Entom. Belgique* 29(1): 5-116.

BRUCH, C. 1915. Catálogo sistemático de los coleópteros de la República Argentina. *Rev. Mus. La Plata* 19: 471-526.

BRUCH, C. 1927. Los coleópteros hidrofílidos y ditíscidos del país. *Physis* 31: 536-553.

MOTSCHULSKY, V. de. 1853. *Hydrocanthares de la Russie*. Helsingfors, Imprimerie de la Société de Litérature Finnoise. 15 pp.

NILSSON, A. N. 2001. *Dytiscidae (Coleoptera). World catalogue of insects. III*. Apollo Books, Stenstrup, Denmark. 395 pp.

RÉGIMBART, M. 1899. Viaggio del Dott. E Festa nella Repubblica dell Ecuador e regioni vicine.

XVI. Dytiscidae et Gyrinidae. *Boll. Mus. Zool. Anat. Comp. Univ. Torino* 14(341): 1-5.

SHARP, D. 1882. On aquatic carnivorous Coleoptera or Dytiscidae. *Sci. Trans. Roy. Dublin Soc.* 2: 179-1003.

SPANGLER, P. J. 1981. Supplement to the aquatic and semiaquatic Coleoptera of Cuba collected by the biospeleological expeditions to Cuba by the Academies of Science of Cuba and Romania. *Résultats des Expéditions Biospéologiques Cubano-Roumaine a Cuba* 3: 145-171.

TRÉMOUILLES, E. R. 1995. Dytiscidae: Methlinae-Hydroporinae. *Fauna de Agua dulce de la República Argentina* 37(1): 5-82.

TRÉMOUILLES, E. R. 1998. Dytiscidae. *In:* Morrone, J. J. & S. Coscarón (dirs.). *Biodiversidad de artrópodos argentinos. Una perspectiva biotaxonómica,* La Plata, Ed. Sur, pp. 210-217.

TRÉMOUILLES, E. R., A. OLIVA & A. O. BACHMANN. 1995. Insecta Coleoptera. *In:* Lopretto, E. C. & G. Tell (dirs.). *Ecosistemas de aguas continentales. 3. Metodologías para su estudio,* La Plata, Ed. Sur, pp. 1133-1197.

TRÉMOUILLES, E. R., P. L. M. TORRES & M. C. MICHAT. 2004. New distributional records and comments for the species of the genus *Queda* (Coleoptera: Dytiscidae). *Rev. Soc. Ent. Arg.* 63(1-2): 38-40.

YOUNG, F. N. 1963. Two new North American species of *Hydrovatus* with notes on other species (Coleoptera: Dytiscidae). *Psyche* 70(3): 184-192.

ZIMMERMANN, A. 1920. Dytiscidae, Haliplidae, Hygrobiidae, Amphizoidae. *In:* Schenkling, S. (ed.), *Coleopterorum Catalogus, vol 4 , pars 71*. Berlin, W. Junk. 1-326 pp.

ZIMMERMANN, A. 1921. Beiträge zur Kenntnis der südamerikanischen Schwimmkäferfauna nebst 41 Neubeschreibungen. *Arch. Naturg.* 87A(3): 181-206.

ZIMMERMANN, A. 1925. Beiträge zur Kenntnis der südamerikanischen Wasserkäfer. *Boll. Mus. Zool. Anat. Comp. Univ. Torino* 39(29): 1-4.

Recibido: 24-IX-2004
Aceptado: 18-IV-2005