

The genus *Hydrochus* LEACH
(Coleoptera; Hydrophiloidea; Hydrochidae)
in South America, with special reference to Argentina*

by Adriana OLIVA

División Entomología, Museo argentino de Ciencias naturales, Av. A. Gallardo 470, 1405
Buenos Aires, Argentina.

Abstract

Material of Hydrochus in the Museo argentino de Ciencias naturales and types of Hydrochus-species described by MAKHAN from South America were examined. Five new species are described: three from Argentina (Hydrochus studiosorum, H. orchymonti and H. multicosatus spp. n.), one from Brazil (H. cristatus sp. n.) and one from Venezuela (H. pseudosecretus sp. n.). A key to South-American species is given. Seventeen new synonymies are stated: H. bruchi KNISCH, 1924 = H. stolpi GERMAIN, 1901; male genitalia described and figured for the first time; dispersion extended to the delta of the Paraná; H. soekhnandanae MAKHAN, 1992 = H. pupillus ORCHYMONT, 1939; H. ramcharani MAKH., 1992 = H. drakei KN., 1920; H. rattanae MAKH., 1992 = H. pumilio KN., 1920; H. vanbergehenegouweni MAKH., 1992 = H. obscurus SHARP, 1882; H. beeneni and H. bruggei MAKH., 1992 = H. piroei MAKH., 1992; H. desenderi MAKH., 1992 = H. ducalis KN., 1921; H. merkli MAKH., 1993 = H. piroei MAKH., 1992; H. jialalae MAKH., 1993 = H. drakei KN., 1920; H. mahunkai MAKH., 1993 = H. secretus KN., 1921; H. radhakishunae MAKH., 1994 = H. pumilio KN., 1920; H. elsjeae MAKH., 1994 = H. obscurus SHARP, 1882; H. soesilae MAKH., 1994 = H. richteri BRUCH, 1915; H. ramdhanii MAKH., 1995 = H. piroei MAKH., 1992; H. johannapietersenae MAKH., 1995 = H. argutus KNISCH, 1921; H. jenniferiduae MAKH., 1995 = H. zicsii MAKH., 1993.

Keywords: Hydrophiloidea, *Hydrochus*, Neotropical Fauna

* Received: 30.V.1995.

Résumé

Le matériel des *Hydrochus* du Museo argentino de Ciencias naturales et les types des espèces d'*Hydrochus* décrites par MAKHAN de l'Amérique du Sud ont été examinés. On décrit cinq espèces nouvelles: trois de l'Argentine (*Hydrochus studiosorum*, *H. orchymonti* et *H. multicostatus* spp. n.), une du Brésil (*H. cristatus* sp. n.) et une du Venezuela (*H. pseudosecretus* sp. n.). On donne une clé pour les espèces sud-américaines. Dix-sept synonymies nouvelles ont été établies: *H. bruchi* KNISCH, 1924 = *H. stolpi* GERMAIN, 1901; genitalia mâles décrits et figurés pour la première fois; distribution élargie jusqu'au delta du Paraná; *H. soekhnandanae* MAKHAN, 1992 = *H. pupillus* ORCHYMONT, 1939; *H. ramcharani* MAKH., 1992 = *H. drakei* KN., 1920; *H. rattanae* MAKH., 1992 = *H. pumilio* KN., 1920; *H. vanbergehenegouweni* MAKH., 1992 = *H. obscurus* SHARP, 1882; *H. beeneni* et *H. bruggei* MAKH., 1992 = *H. piroei* MAKH., 1992; *H. desenderi* MAKH., 1992 = *H. ducalis* KN., 1921; *H. merkli* MAKH., 1993 = *H. piroei* MAKH., 1992; *H. jialalae* MAKH., 1993 = *H. drakei* KN., 1920; *H. mahunkai* MAKH., 1993 = *H. secretus* KN., 1921; *H. radhakishunae* MAKH., 1994 = *H. pumilio* KN., 1920; *H. elsjeae* MAKH., 1994 = *H. obscurus* SHARP, 1882; *H. soesilae* MAKH., 1994 = *H. richteri* BRUCH, 1915; *H. ramdhanii* MAKH., 1995 = *H. piroei* MAKH., 1992; *H. johannapietersenae* MAKH., 1995 = *H. argutus* KN., 1921; *H. jenniferiduae* MAKH., 1995 = *H. zicsii* MAKH., 1993.

Resumen

Se examinó el material de *Hydrochus* del Museo argentino de Ciencias naturales, así como ejemplares tipo de las especies de *Hydrochus* descritas por MAKHAN para América del Sur. Se describen cinco especies nuevas para la ciencia: tres de la Argentina (*Hydrochus studiosorum*, *H. orchymonti* e *H. multicostatus* spp. n.), una de Brasil (*H. cristatus* sp. n.) y una de Venezuela (*H. pseudosecretus* sp. n.). Se da una clave para las especies de América del Sur. Se establecen diecisiete sinonimias nuevas: *H. bruchi* KNISCH, 1924 = *H. stolpi* GERMAIN, 1901; genitales masculinos descritos e ilustrados por primera vez; distribución ampliada hasta el delta del Paraná; *H. soekhnandanae* MAKHAN, 1992 = *H. pupillus* ORCHYMONT, 1939; *H. ramcharani* MAKH., 1992 = *H. drakei* KN., 1920; *H. rattanae* MAKH., 1992 = *H. pumilio* KN., 1920; *H. vanbergehenegouweni* MAKH., 1992 = *H. obscurus* SHARP, 1882; *H. beeneni* y *H. bruggei* MAKH., 1992 = *H. piroei* MAKH., 1992; *H. desenderi* MAKH., 1992 = *H. ducalis* KN., 1921; *H. merkli* MAKH., 1993 = *H. piroei* MAKH., 1992; *H. jialalae* MAKH., 1993 = *H. drakei* KN., 1920; *H. mahunkai* MAKH., 1993 = *H. secretus* KN., 1921; *H. radhakishunae* MAKH., 1994 = *H. pumilio* KN., 1920; *H. elsjeae* MAKH., 1994 = *H. obscurus* SHARP, 1882; *H. soesilae* MAKH., 1994 = *H. richteri* BRUCH, 1915; *H. ramdhanii* MAKH., 1995 = *H. piroei* MAKH., 1992; *H. johannapietersenae* MAKH., 1995 = *H. argutus* KN., 1921; *H. jenniferiduae* MAKH., 1995 = *H. zicsii* MAKH., 1993.

1. Introduction

The Hydrophiloid genus *Hydrochus* is poorly represented in many collections because of its special habitats. These small or very small beetles, aquatic but not swimmers, sluggish in movement, are often passed over by collectors.

For more than forty years, Dr. Axel O. BACHMANN has been collecting aquatic insects, specially Coleoptera and Heteroptera, in many parts of Argentina and sometimes in Paraguay. During the last fifteen years he has been helped by a group of students and co-workers. His collection of aquatic insects, now deposited at the Museo argentino de Ciencias naturales of Buenos Aires, Argentina, is probably the most complete one in South America. This material was the base for a revision of the genus *Hydrochus* in Argentina. It appears to be restricted to the Paraná basin, with the exception of *H. stolpi* in Chile and in the río Negro basin; however, the last species ranges as far north as the delta of the Paraná.

Examination of the species described by MAKHAN in the last five years led to a review of nearly all the species known for South America. An attempt was made to put some order in the genus, basing species-complexes upon models of genitalia. The results are discussed in 4.

A peculiarity that I have remarked in the Hydrophiloidea is that, in species with a wide geographic range, smaller specimens are often found in tropical latitudes than in temperate ones. I state this because the opposite happens in other groups of insects, as in certain Cerambycidae (DI IORIO, personal communication). At the same time, a wide size range may be found within one species in the same locality.

An abstract of this paper was presented at the XX International Congress of Entomology, Firenze, Italy, August 25-31, 1996 (Abstract 11-094).

2. Material and Methods

2.1. Material

Material from the collections in the Museo argentino de Ciencias naturales (MACN) was studied. To complete the key for South-American species, type material of the species described by MAKHAN was also examined, from the following institutions: Institut royal des Sciences naturelles de Belgique (IRSNB), Hungarian Natural History Museum (HNHM), Museum für Naturkunde, Berlin (MNB), Zoologisch Museum, Amsterdam (ZMA) and Naturhistorisches Museum Wien (NMW). Material of *H. stolpi* GERMAIN was lent by the Museo nacional de Historia natural, Santiago, Chile (MNHNS). Holotypes of the new species are deposited at the MACN, except for the Brazilian *H. cristatus*, the holotype of which is at the Museu de Zoologia da Universidade de São Paulo (MZUSP) as a deposit for the INPA (Instituto nacional de Pesquisas da Amazonia). Paratypes are deposited (when in sufficient numbers) at the MZUSP, the Natural History Museum of London (BM), the National Museum of Natural History of Washington (NMNH), the Zoologische Staatssammlung Bayerns

of München, Germany (ZSB) and the Institut royal des Sciences naturelles de Belgique, at Brussel (IRSNB).

A large amount of material in the BACHMANN collection is from one locality, often written down as "INTA Delta". This is an experimental station of the INTA (Instituto nacional de Tecnología agropecuaria, which can be rendered as National Institute for Agriculture Technology). This station is located on the delta of the Paraná (province of Buenos Aires), by the river Paraná de las Palmas and opposite the small settlement of Ingeniero Rómulo Otamendi, now a Nature Reservation. For years, students from the Facultad de Ciencias exactas y naturales (Universidad de Buenos Aires) have collected there, in the station itself or in sites within walking distance. For brevity's sake, this locality has been listed as "delta de Paraná: INTA".

2.2. Methods

2.2.1. *Measuring*: It was performed with a Zeiss stereomicroscope, using a micrometric eyepiece.

To give some description of shape, the elytral Index (EI) was calculated (OLIVA, 1992a). Measurements taken, therefore, were: total length, distance between humeral hump and maximal width of elytra, maximal width of elytra and humeral width. The EI is not a complete description of shape, as it does not measure the degree of narrowing of the elytra behind their maximal width. However, such variations are perhaps better conveyed by habitus drawings.

2.2.2. *Cleaning*: Specimens of the genus *Hydrochus* usually have their dorsum covered by a tenacious crust. This must be removed for study, and as it is not (or hardly) affected by alkali it has posed a problem for some time. Following the advice of Prof. H. BRUGE (personal communication), I tried enzyme soap with excellent results.

For cleaning, dry specimens were relaxed in hot water and specimens in alcohol were rinsed in a little water. A small (5 cm) Petri dish was half filled with water, and about 0.1 cc of a commercial powdered enzyme soap was tipped in. After stirring, the beetles were left overnight in this solution. As much as fifteen specimens were cleaned at a time; specimens not mounted the following day were sometimes left for 2-3 days in the soap solution without damage. Plain tap water was used, as in Buenos Aires this is extremely soft. Distilled water should be used where running water is hard. The soap appears to lose some of its detergative power if kept for more than five or six weeks.

The genitalia were not treated with alkali, since this sometimes causes severe distortion. They were stored in microvials with glycerine, pinned through by the pin holding the specimen. The microvials were manufactured from 15 mm lengths of 2 mm catheter tube, sealed by heat and stoppered with small lengths of turned soft wood. In the case of beetles under 5 mm, it is often difficult to retrieve the small dissected pieces from commercial genitalia vials.

For the rest, the methods were the usual for this type of work.

3. Systematic part

3.1. Key to south-American species of *Hydrochus* (The asterisk indicates species found in Argentina)

- 1 - Head, pronotum and elytral interstriae covered with granules 2-4 times as large as ommatidia (Fig. 1). A strongly raised hump on interstria 5th, another one (in front of precedent) on 7th. Dorsum melanic, shining, granules often alutaceous with metallic iridescence. Legs diffusely dark. Male genitalia as in figure 2. Argentina: delta of the Paraná *H. studiosorum* sp. n.*
- 1' - Head and pronotum with sunken punctures; granules, if any, restricted to the sides of pronotum, rarely larger than ommatidia; if present on elytral interstriae minute 2
- 2 - Length above 4.5 mm. Shape only weakly broadened at posterior third of elytra. Pronotum flat, squarish, with a pair of small anteromedial depressions. Femora black, tibiae testaceous 3
- 2' - Length under 4.5 mm; if larger, then shape strongly broadened at posterior third of elytra, behind this abruptly narrowed. Pronotum with a single round anteromedial depression. Legs testaceous, with apices of femora, tibiae and distal tarsomeres dark 4
- 3 - Shape very narrow. Interstriae on elytral disk wider than striae, flat; hump on 5th minute, frequently marked only by dense hair-bearing punctures; 4th not costate. Femora iridescent. Male genitalia with median lobe much shorter than paramera. Paraná basin (Argentina and Paraguay) as far south as Santa Fe: Rosario; Uruguay: Artigas; Brasil: Mato Grosso (typ. loc.) *H. metallipes* KNISCH, 1921*
- 3' - Shape rather broad. Interstriae a little narrower than striae, convex, 4th usually costate for a short stretch in front of small hump in 5th. Femora not iridescent. Male genitalia with median lobe as long as paramera. Paraná basin down to the delta; Brazil: Mato Grosso (typ. loc.), Porto Alegre; Venezuela *H. ducalis* KNISCH, 1920*
(= *H. desenderi* MAKHAN, 1992)
- 4 - Shape strongly broadened on posterior third of elytra, behind this abruptly narrowed (Fig. 18). Elytral apices broadened (Figs 18, 19), with apical unpunctured area, 3-4 times as wide as striae punctures (not counting one puncture usually found between striae 1st and 2nd). Elytral interstriae narrow, the third conspicuously raised on elytral declivity; hump on fifth interstria strongly raised. Length above 4 mm. Dorsum usually lead-grey with weak iridescence . . . 5
- 4' - Shape narrow or broad, but not abruptly narrowed behind the greater width of elytra. Unpunctured area on extreme apex of the elytra

- not more than 2 times as wide as stria punctures. Hump on fifth interstria moderate, small or absent. Length rarely above 4 mm . 7
- 5 - Hump on fifth interstria exceptionally large, including a part of fourth interstria. Male genitalia with short basal piece, paramera hardly narrowed on distal half, median lobe broad, narrowly rounded at apex, as long as paramera. Brasil: Mato Grosso; Bolivia: Beni. Rare *H. secretus* KNISCH, 1920
(= *H. mahunkai* MAKHAN, 1993)
- 5' - Hump on fifth interstria strongly raised but small, not including a part of fourth interstria 6
- 6 - Fourth interstria raised into a cost in front of hump on fifth, which also bears a small anterior hump (Fig. 18). Elytral apices angular outwards (Fig. 19). Male genitalia as in Fig. 20. Venezuela: Barinas *H. pseudosecretus* sp. n.
- 6' - Fourth interstria not raised into a cost in front of hump on fifth; this without an anterior hump. Elytral apices not distinctly angular on outer part. Apices of paramera distinctly sagittate. Suriname; probably Venezuela *H. choenii* MAKHAN, 1992
- 7 - Length usually under 2.5 mm. Interstriae very narrow on elytral disk, less than 1/2 the width of striae (save *H. baloghi*). Hump on 5th minute or absent 8
- 7' - Length usually above 2.5 mm. Interstriae on elytral disk at least as wide as 1/2 of striae, if narrower the hump on 5th strongly raised or else replaced by a narrow cost 18
- 8 - Shape elongate-oval; elytral apices separately rounded, produced (Fig. 15). Pronotum and elytra often testaceous, not or weakly iridescent 9
- 8' - Shape elongate; elytral apices not produced as in figure 15, usually rounded taken together 10
- 9 - Elytral interstriae convex, the odd-numbered ones only a little more so, 11th with a semicircular section. Tibiae narrow, with rows of minute spines not perceivable under less than 100 × (Fig. 17). Male genitalia with very short basal piece, paramera long and narrow, arched inwards, median lobe broadly rounded at apex, a little shorter than paramera. Head and scutellum melanic, with strong metallic sheen. Argentina: lower Paraná basin; Paraguay *H. richteri* BRUCH, 1915*
(= *H. soesilae* MAKHAN, 1994)
- 9' - Odd-numbered elytral interstriae raised into costs, 7th interrupted; even-numbered ones weakly raised (Fig. 15), 11th carinate, with

- angular cross-section. Tibiae thick, narrowed on basal third and on apex, with rows of large spines (Fig. 16). Clypeus smooth, with fine, sparse punctures, testaceous; frons coarsely punctured. Brazil: Amazonas, Pará *H. cristatus* sp. n.
- 10 - Elytral apices with subapical crescent-shaped depressions. Shape broad. Dorsum usually black, not or weakly iridescent. Odd-numbered interstriae raised; 9th overhanging 10th and forming a bulge that accounts in part for the broad shape. Male genitalia with a remarkably long basal piece, the median lobe much longer than the paramera. Paraná basin, as far south as the delta; Brazil: M. Grosso *H. argutus* KNISCH, 1921*
(= *H. johannapietersenae* MAKHAN, 1995)
- 10' - Elytral apices without subapical depression 11
- 11 - Tibiae thick, not markedly narrowed at base, with spines apparent under 100 × (Figs 22, 28, 30) but not as large as in *H. cristatus* (Fig. 16). All the odd-numbered interstriae convex; 11th not forming a ridge as in *H. cristatus* sp. n 12
- 11' - Tibial spines minute, not apparent under 100 ×. Inner interstriae never costate except for short stretches 14
- 12 - Sculpture on head and pronotum remarkably coarse (punctures equal 2-4 ommatidia), contiguous. Odd-numbered interstriae weakly raised, save for stretches of 5th and 9th; 7th not interrupted; 4th not raised. Length above 2.5 mm (females). Tibiae as in figure 22. Dorsum entirely melanic, iridescent. Suriname *H. dewnaraini* MAKHAN, 1992
- 12' - Sculpture on head and pronotum moderately coarse 13
- 13 - Interstria 4th raised as strongly as 3rd and 5th on most of the disk (Fig. 32); 9th very strongly costate, in the posterior 1/2 swollen and distinctly thicker than 7th (Fig. 27). Pronotum with deep, densely punctured depressions; sides with a few granules, 1-2 times the size of ommatidia. Dorsum black, with or without iridescence. Length 1.8-2.4 mm. Tibiae very thick, narrowed in basal 1/4 (Fig. 30). Male genitalia as in figure 31. Bolivia: Beni; Paraguay: Paraguari *H. zicsii* MAKHAN, 1993
(= *H. jenniferiduae* MAKHAN, 1995)
- 13' - Fourth interstria not costate; 9th costate but not swollen, not thicker than 7th (Fig. 26). Pronotum coarsely punctured even between the well-defined depressions; sides finely granulated. Colour of dorsum dull black to bright green. Tibiae moderately thick, not narrowed at base (Fig. 30). Male genitalia abnormal, as in figure 29. Shape short, rather broad. Bolivia: Beni; Paraguay *H. pietersenae* MAKHAN, 1993

- 14 - Pronotum with straight sides, bearing granules larger than ommatidia. Interstria 9th costate at least on anterior half. Usually the head with distinctly stronger sheen or iridescence than the rest of the dorsum 15
- 14' - Pronotum with sinuate sides, not, or very finely, granulated . . . 16
- 15 - Pronotum trapeze-shaped, strongly narrowed at base, strongly and densely punctated on well-marked depressions. Interstria 9th overhanging 10th on anterior half. Shape narrow, rather elongate. Male genitalia with paramera abruptly turned inwards at apex, median lobe hardly shorter than paramera, blunt. Usually head with strong metallic sheen. Paraná basin as far south as the delta; Brazil: M. Grosso, P. Alegre; Suriname *H. pumilio* KNISCH, 1920*
(= *H. rattanae* MAKHAN, 1992;
= *H. radhakishunae* MAKHAN, 1994)
- 15' - Pronotum squarish, with dense, regular punctures, not or hardly larger than those on frons, both on raised parts and on the indistinct depressions. Interstria 9th not overhanging costate 10th (Fig. 25). Shape rather short. Male genitalia with very short basal piece; paramera narrow, apices acuminate, curved inwards; median lobe as long as paramera, rounded at apex. Dorsum dark to black; head iridescent. Bolivia: Beni *H. baloghi* MAKHAN, 1993
- 16 - Outer interstriae costate, 9th overhanging 10th on the second 1/4 of the elytra only. Dorsum usually dull-coloured, with iridescence restricted to head. Male genitalia with paramera acuminate, not turned inwards at apex; median lobe slender, blunt, much shorter than paramera. Shape rather narrow, moderately long. Brazil *H. coeneni* MAKHAN, 1992
- 16' - Interstria 9th not overhanging 10th. Usually the whole dorsum with strong metallic sheen 17
- 17 - Shape short and moderately broad (Fig. 7). Interstria 5th without hump, rarely with a minute one; 3rd costate, at least on a stretch alongside the hump on 5th or its place; 9th wider than 10th. Male genitalia with median lobe much shorter than paramera, rounded at apex. Paraná basin as far south as the delta; Brazil: M. Grosso; Perú: Loreto; Suriname *H. pupillus* ORCHYMONT, 1939*
(= *H. soekhnandanae* MAKHAN, 1992)
- 17' - Shape long and narrow (Fig. 3). Interstria 5th raised into a cost rather than a hump (Fig. 3); 3rd not costate alongside that place; 9th about as wide as 10th. Male genitalia as in Figs 4, 5. Paraná basin as far south as the delta; Uruguay *H. orchymonti* n.sp. (small specimens)*

- 18 - Pronotum flat, disk not or hardly raised. Shape more or less narrow (Figs 8, 10) 19
- 18' - Pronotum with at least the anteromedial depression large, usually well-marked, disk raised (Fig. 3) 21
- 19 - Shape long, narrow (Fig. 8). Pronotum with small, shallow depressions. Inner interstriae flat; hump on 5th very small; 7th and 8th not costate save at the very base; 9th overhanging 10th between 1/4 and 1/2 of elytral length and partly behind half of its length, distinctly wider than 10th in most of its length. Male genitalia as in Fig. 9. Argentina: Formosa; Paraguay: Itapuá, Asunción (typ. loc.); Brasil: Mato Grosso *H. drechseli* MAKHAN, 1995*
- 19' - Shape shorter, and in most cases broader, than in Fig. 8 20
- 20 - Pronotum squarish, with indistinct depressions. Elytral interstriae on elytral disk as wide as striae, straight. Hump on 5th small but distinct. Ninth interstria weakly swollen, not forming a distinct bulge, more convex than the 10th but not quite overhanging it. Median lobe of male genitalia thick, much shorter than paramera. Paraná basin, as far south as the delta; rare; Brasil: M. Grosso (typ. loc) *H. variabilis* KNISCH, 1921*
- 20' - Pronotum narrowed at base (Fig. 10). Elytral interstriae raised, about half as wide as striae or somewhat less, at several points zigzagging because of large striae punctures. Hump on 5th interstria often reduced to a cost. Interstria 7th costate, 8th costate in anterior half, interrupted at hump in 9th, which is swollen on posterior half. Male genitalia as in figure 11. Argentina: lower Paraná basin; Uruguay: southern coast; Paraguay: Asunción (typ. loc.); Brazil: Mato Grosso *H. teunissenii* MAKHAN, 1994*
- 21 - Odd-numbered interstriae strongly costate, the fifth with two elongate, strongly raised humps (Fig. 13), 9th overhanging 10th on most of its length. Pronotum strongly narrowed at base, sinuate sides finely granulated. Usually head and pronotum with strong metallic sheen, elytra iridescent with dark areas. Male genitalia as in Fig. 14. Paraná basin, very frequent at the delta; Uruguay: Canelones *H. multicostatus* sp. n.*
- 21' - Interstria 5th with only one hump 22
- 22 - Elytral apices strongly broadened, outwards angular, inwards rounded. Hump on interstria 5th small but strongly raised, inner interstriae not raised in front of it. Interstria 7th and 9th costate; 9th swollen between 2/5 and 3/5 of elytral length, overhanging the narrow and convex 10th interstria. Dorsum usually dark grey with weak iridescence. Paraná basin, as far south as Santa Fe (Santo

- Tomé, quite close to the provincial capital); Brasil: M. Grosso (typ. loc.); Suriname *H. drakei* KNISCH, 1920*
(= *H. ramcharani* MAKHAN, 1992;
H. jialalae MAKHAN, 1993)
- 22' - Elytral apices not or slightly broadened, if distinctly so interstriae 3rd and 4th raised in front of hump on 5th 23
- 23 - Pronotum a little wider than long; sides sinuate, with granules 1-2 times the size of an ommatidium; punctures coarse, on depressions more so. Interstriae costate, the odd-numbered ones a little more so; 1st noticeably raised near elytral apex; 5th with small, often indistinct hump, 9th with small bulge marking the greatest width of shape; 10th not distinctly overhung by 9th, both interstriae costate, narrow, of about the same width. Male genitalia as in figure 21. Dorsum black, with or without metallic iridescence or strong sheen. Basin of the río Negro and delta of the Paraná, possibly also in intermediate areas; Chile: Valparaíso
. *H. stolpi* GERMAIN, 1901*
(= *H. bruchi* KNISCH, 1924)
- 23' - Pronotum as wide as long; sides not or minutely granulated. Interstria 9th overhanging 10th which is not costate; if otherwise, then 9th not forming a bulge about the middle of the elytral length 24
- 24 - Shape narrow, elytra almost parallel-sided (Fig. 3). Punctures on the inner elytral striae squarish or polygonal; interstriae half the width of striae or rather less. Interstria 5th raised into a cost before elytral declivity, but not forming a distinct hump (Fig. 3). (If in doubt about this character, see also *H. piroei*). Interstria 9th not overhanging 10th, both about the same width, costate. Male genitalia with narrow, acuminate paramera; median lobe as long as paramera, acuminate, in lateral view nearly straight, without a subapical membranous ridge (Figs 4, 5, compare Fig. 6). Dorsum usually with strong metallic sheen. Paraná basin, as far south as the delta; Uruguay, widespread *H. orchymonti* sp. n. (large specimens)*
- 24' - Shape elongate, but distinctly broadened on posterior third. Fifth interstria with small but distinct hump; if hump indistinct, then interstriae 3rd and 4th distinctly raised in front of hump on 5th 25
- 25 - Striae with squarish punctures on elytral disk; interstriae on disk rather less than half the width of striae, raised. Interstria 9th overhanging 10th on anterior half, forming a small bulge about the middle of the elytral length, behind this both interstriae convex. Male genitalia with narrow paramera broadly rounded at apex, median lobe a little shorter than the paramera, acuminate (Fig. 12), in lateral view straight, without apical ridges (compare with Fig. 24).

- Paraná basin as far south as the delta; Uruguay; rare; Brazil: Mato Grosso (typ. loc.) *H. purpureus* KNISCH, 1920*
- 25' - Striae with round punctures on elytral disk. Elytral interstriae 1/2 to 3/4 of width of striae 26
- 26 - Interstria 5th costate on disk for a short stretch, with a strongly raised, oblong hump; 9th costate and overhanging 10th on the whole of its length, not forming a bulge at the middle. Elytral punctures very close, but not square. Male genitalia as in figure 24. Suriname *H. battjai* MAKHAN, 1992
- 26' - Interstria 5th with moderate to small hump; in front of this, at least interstria 4th raised for a short stretch. Male genitalia with median lobe shorter than paramera 27
- 27 - Interstria 4th weakly costate in front of small hump on 5th; 3rd not costate; 9th costate and overhanging 10th in the whole of its length except behind, at the very end. Male genitalia with basal piece very short, paramera dilated at apex. Length of holotype: 2.7 mm. Suriname *H. jethoeae* MAKHAN, 1993
- 27' - Interstriae 3rd and 4th costate for short stretches in front of hump on 5th. Male genitalia with median lobe sinuate in lateral view (Figs 6, 23) 28
- 28 - Inner elytral interstriae flat at base. Hump on 5th usually well-marked. Interstria 9th swollen and broadened behind the small bulge that marks the middle of the elytral length, overhanging 10th only at a point behind the humeral hump. Elytral apices often broadened in large specimens. Male genitalia with basal piece asymmetrical at base; paramera sagittate, sometimes indistinctly; median lobe with apical membranous ridge (Fig 6). Dorsal colouring variable. Intra-specific diversity very great; size 2.7-4.7 mm; large and small specimens are found together. Paraná basin as far south as the delta; Uruguay; (geographic range very wide; typ. loc. Guatemala)
. *H. obscurus* SHARP, 1882*
(= *H. corruscans* BRUCH, 1915;
= *H. vanbergehenegouweni* MAKHAN, 1992;
= *H. elsjeae* MAKHAN, 1994)
- 28' - Inner elytral interstriae weakly costate at base. Fifth interstria with hump small or indistinct. Interstria 9th hardly wider than 10th, more strongly raised than the later but not quite overhanging it, not forming a bulge about the middle of the elytral length. Male genitalia with basal piece symmetrical at base; paramera acuminate, rarely somewhat sagittate; median lobe sinuate, without a subapical ridge (Fig. 23; compare Figs 5, 6). Size smallish: 2.7-3.0 mm. Argentina:

Misiones (*sub merkli*); Suriname; Cayman Islands; Brazil: M. Grosso; Colombia *H. piroei* MAKHAN, 1992*
 (= *H. bruggei* MAKHAN, 1992;
 = *H. beeneni* MAKHAN, 1992;
 = *H. merkli* MAKHAN, 1993;
 = *H. ramdhanii* MAKHAN, 1995)

3.2. Description of new species

3.2.1. New species from Argentina

Hydrochus studiosorum sp. n. (Figs 1-2)

Diagnosis: Moderate-sized, elongate, broad. Dorsum melanic, shining; head, pronotum and elytral interstriae covered with raised granules (Fig. 1), alutaceous, in most specimens iridescent. Femora and tibiae dark. Elytral punctures coarse, polygonal. Elongate humps on interstriae 5th and 7th; 9th overshadowing 10th. Male genitalia as in figure 2.

Description: Length 3.0-3.5 mm. Shape moderately elongate, rather broad. EI = 3.25-3.36. EI/Long: 0.96-1.12

Dorsum black, in some specimens piceous, shining; granules on head, pronotum and interstriae alutaceous, in most specimens iridescent, with blue as dominant colour. Femora and tibiae diffusely dark to black.

Granules on clypeus a little larger than an ommatidium; on frons about twice as large as ommatidia, on pronotum 3-4 times, on elytral interstriae about twice as large as ommatidia. Granules contiguous; on pronotal disk a few coarse, deep punctures are seen. Pronotal disk raised, with deep indistinct depressions; sides convex, appearing crenulate because of granules. A few granules (about twice the size of ommatidia) at base of scutellum. Elytral striae with very coarse punctures, contiguous and therefore squarish to polygonal. Interstriae very narrow, raised, the odd-numbered ones more strongly so. Interstria 1st raised on most of its length; 3rd and 4th at base; 5th at base, also for a stretch on anterior half of elytra (Fig. 1). Elongate humps (appearing each as a row of sharply raised granules) on interstria 5th at the usual point, on 7th a little in front of former. Interstria 9th costate, overshadowing 10th in most of its length. Elytral apices separately rounded.

Male genitalia (Fig. 2): basal piece about as long as distal ones, asymmetrical at base. Paramera gradually acuminate, with apices a little turned inwards. Median lobe a little shorter than paramera, narrow at base, weakly broadening towards the rounded apex.

Material examined: From Argentina: provincia de Buenos Aires: delta del Paraná: INTA, 27.I.1973 leg. A.O. BACHMANN: male holotype and one male paratype at the MACN. Allotype also at the MACN, ex coll BRUCH, from Buenos Aires, leg. C. BRUCH, with label "KNISCH det., 1924/*Hydrochus*/n. sp. prope/*squamifer* LeC/ (vertical) unicum". Delta del Paraná, INTA: 21-24.IX.1978, leg. BACHMANN: 1 male paratype at the MACN, 1

female paratype at the NMNH. Same locality and collector, 21-28.I.1982: 1 male paratype at the BM. Same locality and collector, 27.I.1973: 1 female paratype at the ZSM. From Argentina: provincia de Entre Ríos: Victoria: arroyo Los Manantiales, 7.II.1982, leg. BACHMANN, 1 male paratype at the MACN. One specimen from Delta (no further data), 27.III.1953, leg. BACHMANN, at the MACN. (See 2.1. for explanation of locality "INTA").

Discussion: The name derives from latin *studiosus*, -a, -um, in the plural genitive, meaning "the diligent ones" (the expression *studiosus venandi* meaning "fond of hunting"). I dedicate the species to the group of scientists and students who for years searched painstakingly for every sort of aquatic insect in the area of the Paraná delta, under the direction of Dr A.O. BACHMANN (who is too modest to accept that a new species should bear his name).

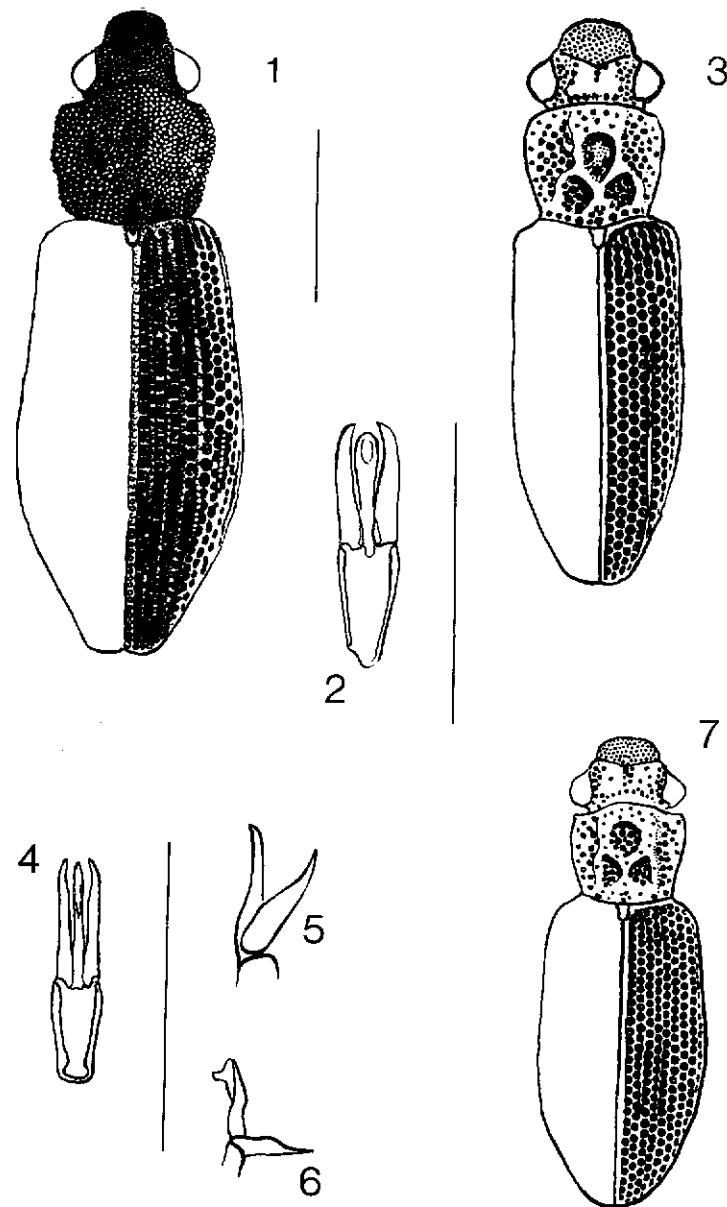
This is the only known south-American species with granules instead of punctures on head and pronotum. As the species has been found only at the delta of the Paraná, the possibility of it being introduced by man (through Buenos Aires or from overseas craft, which go upstream as far as Rosario) should be taken into account. I have checked with SMETANA's excellent review of Canadian Hydrophilidae (1988) and I find that there are only four species of *Hydrochus* with their head and pronotum covered by granules: *H. squamifer* LECONTE, 1855, *H. granulatus* BLATCHLEY, 1910, *H. neosquamifer* SMETANA, 1988 and *H. pseudosquamifer* MILLER, 1965. All these can be easily distinguished from *H. studiosorum* sp. n. by their small, shallow hump on the 5th interstria and by the absence of a hump on the 7th interstria. SMETANA remarks on the peculiar appearance of the granules, which bear each a patch of metallic iridescence. No European species with granules is mentioned in ANGUS (1977). I think that the possibility of an introduction may be discarded, and that *H. studiosorum* sp. n. is indeed an autochthonous species, perhaps one retaining some plesiomorphic characters (see Discussion).

Hydrochus orchymonti sp. n. (Figs 3, 4, 5)

Diagnosis: Small; elongate, narrow (Fig. 3). Dorsum with strong metallic sheen. Sides of pronotum sinuate, smooth. Elytral interstriae narrow, convex; hump on 5th reduced to a raised stretch; 9th, 10th and 11th costate, all raised in about the same degree. Male genitalia as in figures 4, 5.

Description: Size moderate to small. Length: 2.2-3.0 mm. Shape elongate, narrow (compare with *H. pupillus*, Fig. 7). EI: 3.36-7.58. EI/Long: 1.03-3.03.

Dorsum with strong metallic sheen; in typical series purple and coppery colours dominate. Legs testaceous with the usual dark markings.



Figs 1-2. *Hydrochus studiosorum* sp. n. 1: habitus view, 50 ×; 2: male genitalia, 100 ×. Figs 3-5. *H. orchymonti* sp. n. 3: habitus view, 50 ×; 4: male genitalia, 100 ×; 5: median lobe of genitalia (lateral view), 100 ×. Fig. 6. *H. obscurus* SHARP, 1882: median lobe of male genitalia (lateral view), 100 ×. Fig. 7. *H. pupillus* ORCHYMONT, 1939, habitus view, 50 ×. All the scale-lines = 0.5 mm

Punctures on clypeus regular, a little larger than ommatidia, moderately dense; on frons a little coarser, irregular, most of them on the Y-shaped groove and the inner margin of eyes. Pronotum with round, moderately coarse punctures, rather dense on depressions, sparse on raised parts of disk. Sides convex, with small inflection at narrowed base, smooth. Elytral striae with round, contiguous punctures, on 1st and 2nd rather square or polygonal. Interstriae narrow, convex, 1st costate, 3rd costate at base, 5th at base and on edge of disk in place of usual hump. The three outer interstriae costate, all raised in the same degree, the 9th without a bulge near the middle of elytral length and hardly wider than 10th.

Male genitalia (Figs 4-5): Basal piece small, symmetrical, about 2/5 of total length. Paramera long and narrow, apices acuminate, weakly curved inwards. Median lobe narrow, as long as paramera; apex acuminate, in lateral view not sinuate, only thickening towards base, without membranous ridge (Fig. 5; cf. Figs 6, 23); large subapical fenestra.

Material examined: Male holotype, allotype and 2 male paratypes from Argentina: Buenos Aires: delta of the Paraná: INTA, VII.1968, leg. BACHMANN, at the MACN. Same data: one paratype of each sex at the BM, the ZSM and the NMNH. Same locality and collector, 20-28.I.1982: 4 male paratypes at the MACN; one paratype of each sex at the MZUSP and the IRSNB. Also: same locality and collector: XII.1978; 9-15.I.1978; 2-7.I.1979; 21.II.1981; 21-23.XI.1981; 10-15.I.1982. Buenos Aires: Tigre, ex coll. BREYER; Martínez, 4.X.1926, leg. BRIDAROLLI; Moreno, 5.I.1963, leg. HEPPER; Rauch (FCS), IV.1931, leg. DAGUERRE (ORCHYMONT det. "corruscans BRUCH"); V. Alsina, 27.III.1955, leg. BACHMANN; S. Vicente, 12.VI.1955, leg. BACHMANN; Chascomús, 9.V.1966 (on *Azolla filiculoides*), leg. R. RONDEROS. Entre Ríos: Victoria: arroyo Los Manantiales, II.1978, leg. BACHMANN (large series); 9.II.1982, leg. OLIVA (large series); Colón: arroyo Mendoza, I.1989, leg. OLIVA; Colón: Parque nacional El Palmar, 15.XI.1980, leg. BACHMANN. Santa Fe: Garay: Colonia Mascías, X.1942, leg. VIANA. Chaco: San Bernardo, 5.III.1978, leg. Di Iorio. Uruguay: Maldonado: San Carlos, 10.I.1981, leg. BACHMANN; Canelones: ruta 8 and 11, near Soca, 19.I.1981, leg. BACHMANN; Lavalleja: río Cebollatí: picada de Rodríguez, 5.I.1957, leg. CARBONELL.

Discussion: this species is dedicated to Armand d'ORCHYMONT, a keen student of Palpicornia of the world. I understand this to be the species he called "la petite forme, d'un métallique brillant, du *corruscans* BRUCH" (ORCHYMONT, 1939). *Hydrochus corruscans* is a synonym of *H. obscurus* SHARP, 1882 (see OLIVA, 1992a), a species with a great intraspecific diversity. The holotype from Guatemala measured 2.8 mm (OLIVA, 1992a); many specimens from Buenos Aires are much larger, but this is often the case with species of wide distribution (see Introduction). The basal piece of the male genitalia is asymmetrical at base. The paramera are sagittate, sometimes weakly; the median lobe is distinctly shorter than the paramera, in lateral view weakly sinuate and bearing an apical membranous ridge (Fig. 6). The hump on the 5th elytral interstria is small but distinct; the 9th interstria overhangs 10th only just behind humeral hump, it is raised into a small bulge about the middle of elytral length, and swollen behind

this. Most specimens have small black spots on the elytra, which I have not observed in *H. orchymonti* n. sp. Having found the membranous ridge on the median lobe of the specimen labelled "*H. corruscans*" by RÉGIMBART (in coll. BRUCH), I convinced myself that the specimens which agreed with ORCHYMONT's description were not conspecific with *H. corruscans* BRUCH, and therefore with *H. obscurus*.

H. orchymonti n. sp. differs from *H. piroei* MAKHAN, 1992 by the squarish or polygonal punctures on the two inner elytral striae, by the somewhat narrower, almost parallel-sided shape (which can be doubtful in specimens mounted with parted elytra), and by the median lobe of the male genitalia, which is quite as long as the paramera, not sinuate, acute at apex (compare figures 5, 23). The hump on the 5th interstria is usually better defined in *H. piroei*, being reduced to a costate stretch in the new species.

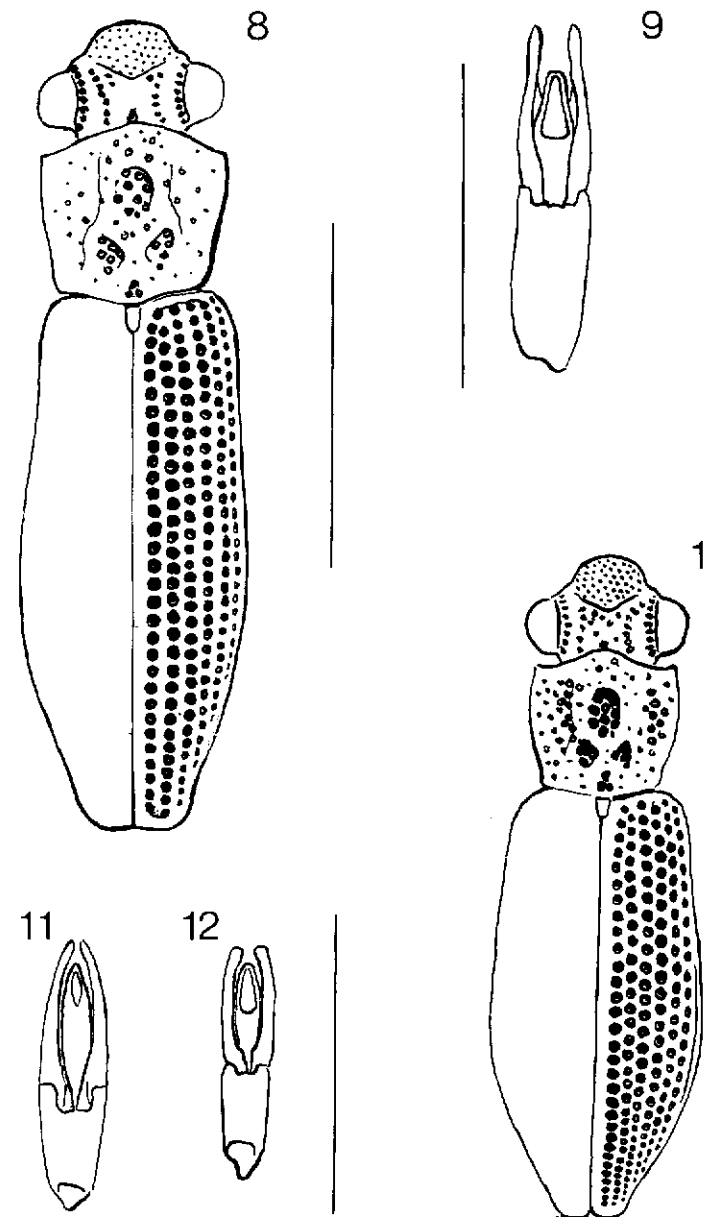
On the other hand, *H. orchymonti* n. sp. resembles *H. pupillus* ORCHYMONT, 1939. The new species has a longer and narrower shape (compare figures 3, 7) and a costate stretch on the 5th elytral interstria, while in *H. pupillus* there is a minute hump or none. In many specimens of ORCHYMONT's species the 3rd interstria is costate for a short stretch alongside the hump of the 5th (Fig. 7); in peruvian specimens the interstria is costate in its whole length (but never 3rd costate only at base, as in the new species). The male genitalia are quite different; the paramera of *H. pupillus* are broadened subapically and the median lobe is short and thick. Most specimens of *H. orchymonti* n. sp. are distinctly larger than normal specimens of *H. pupillus*, but it must be remembered that most species of Hydrophiloidea show a remarkable size range.

Hydrochus multicostatus sp. n.
(Figs 13-14)

Diagnosis: Moderate-sized, elongate, rather broad. Head and pronotum with bright metallic colours; elytra iridescent with piceous spots. Pronotum narrowed at base, sides convex, granulated. Head and pronotum with coarse, dense, irregular punctures. Elytral striae with coarse punctures; interstriae raised, odd-numbered ones about half as wide as striae, even-numbered ones narrower. Fifth interstria with two elongate humps (Fig. 13); 9th overhanging 10th in most of its length; 11th costate in posterior half. Male genitalia as in figure 14.

Description: Size moderate. Length: 3.2-3.8 mm. Shape elongate, rather broad. EI: 2.75-5.76. EI/Long: 0.86-1.80.

Dorsum of head, pronotum and scutellum with strong metallic sheen, with bright colours, gold-green dominating. Raised portions of elytral interstriae alutaceous, iridescent, blue dominating. Bottom of punctures and such stretches of the interstriae as are not raised, piceous, shining. Legs testaceous with the usual dark markings.



Figs 8-9. *H. drechseli* MAKHAN. 8: habitus view, 50 ×; 9: male genitalia, 100 ×. Figs 10-11. *H. teunissenii* MAKHAN. 10: habitus view, 50 ×; 11: male genitalia, 100 ×. Fig. 12: *H. purpureus* KNISCH, 1921: male genitalia, 100 ×.

Head and pronotum with coarse, dense, irregular punctures. Pronotum narrowed at base; sides convex, finely granulated. Depressions deep, indistinct, more densely punctured than the rest of the disk. Elytral striae with coarse contiguous punctures, round to polygonal. Interstriae convex. Odd-numbered interstriae about half as wide as striae; even-numbered ones narrower. First interstria raised in most of its length; 3rd on elytral declivity and a little between humps on 5th; 5th with two elongate humps, one on usual place, the other in front as in figure 13; 7th raised for a short stretch in front of posterior hump on 5th; 8th raised on humeral hump (being the only one of the even-numbered interstriae with a raised stretch); 9th costate, overhanging 10th in most of its length; 11th costate on posterior half. Elytral apices rounded, weakly angular outwards but the angular portion curving downwards, usually not apparent. The apical, unpunctured area of each elytron is about 2 times as wide as the striae in most specimens and it bears minute granules.

Male genitalia (Fig. 14): Basal piece small, symmetrical at base, about 2/5 of total length. Paramera acuminate, with apices slightly turned inwards. Median lobe narrowly pear-shaped, shorter than paramera; apex rounded, with a subapical fenestra.

Material examined: Male holotype, allotype, and 3 female paratypes from Argentina: Buenos Aires: delta del Paraná, INTA, II.1979 (light-trap), leg. BACHMANN, at the MACN. One male and 3 female paratypes of the same locality, 6-16.II.1979, in water, leg. BACHMANN, at the MACN. From the same locality and collector, 8-9.I.1979, 1 male and 2 female paratypes at the BM. From the same locality and collector, 21-29.II.1978, 1 female paratype at the MACN; 1 male and 1 female paratype at the ZSM; 1 female paratype at NMNH; 1 female paratype at the MZUSP, 1 female paratype at the IRSNB.

Also: Same locality and collector: 27.III.1953; 3.IV.1953; VII.1968; XII.1971; II.1972; III.1977; 2.VI.1978; 21-24.IX.1978; 2-7.I.1979; 21.IX.1979; 19.X.1981; II.1981; 20-28.I.1982; 24.II.1992; delta of the Paraná: arroyo Martínez, 6.12.I.1977, leg. BACHMANN; Buenos Aires: Tigre (mainland opposite delta of the Paraná), 30.XI.1952, 7.XII.1952, 27.III.1953, leg. BACHMANN; Entre Ríos: Victoria, in water, 23-26.III.1981, leg. BACHMANN; Chaco: arroyo Ortega, 6.VIII.1978, leg. BACHMANN and ANGRISANO; Formosa: near arroyo He-he Grande, 11.VIII.1978, same collectors; Formosa: 5 km W of Clorinda, 10.VIII.1978, same collectors. Uruguay: Canelones: ruta 8 and 11, near Soca, 10.I.1981, leg. BACHMANN.

Discussion: The name derives from latin *multus*, -a, -um, "many" and *costa*, -ae, "cost", alluding to the raised odd-numbered elytral interstriae.

This species can easily be recognized by the two well-developed humps on the 5th interstria (*H. pseudosecretus* sp. n. has an anterior costate stretch on the 5th interstria, sometimes amounting to an indistinct hump). Well-cleaned specimens nearly always show a contrast between the strongly shining, bright-coloured head and pronotum, the iridescent, alutaceous elytral costs and humps, and the dark, shining elongate spots. The male genitalia are remarkably short; the only species in which the genitalia resemble those of *H. multicosatus* is *H. iduae* MAKHAN, 1994, which I

have not seen. However, in this species the median lobe is acuminate, as long as the paramera; in the new species it is rounded at apex, shorter than the paramera. Besides, MAKHAN's species is stated to have flat interstriae without humps. *H. multicosatus* sp. nov. seems very abundant in the delta of the Paraná.

3.2.2. New species from intertropical America

Hydrochus cristatus sp. n.

(Figs 15-16)

Diagnosis: small, oval, with odd-numbered elytral interstriae raised into costs or ridges (Fig. 15). Tibiae swollen, with outer series of long spines (Fig. 16)

Description: Size small. Length of female holotype: 2.4 mm. Shape short and broad. EI = 1.59. EI/Length: 0.66.

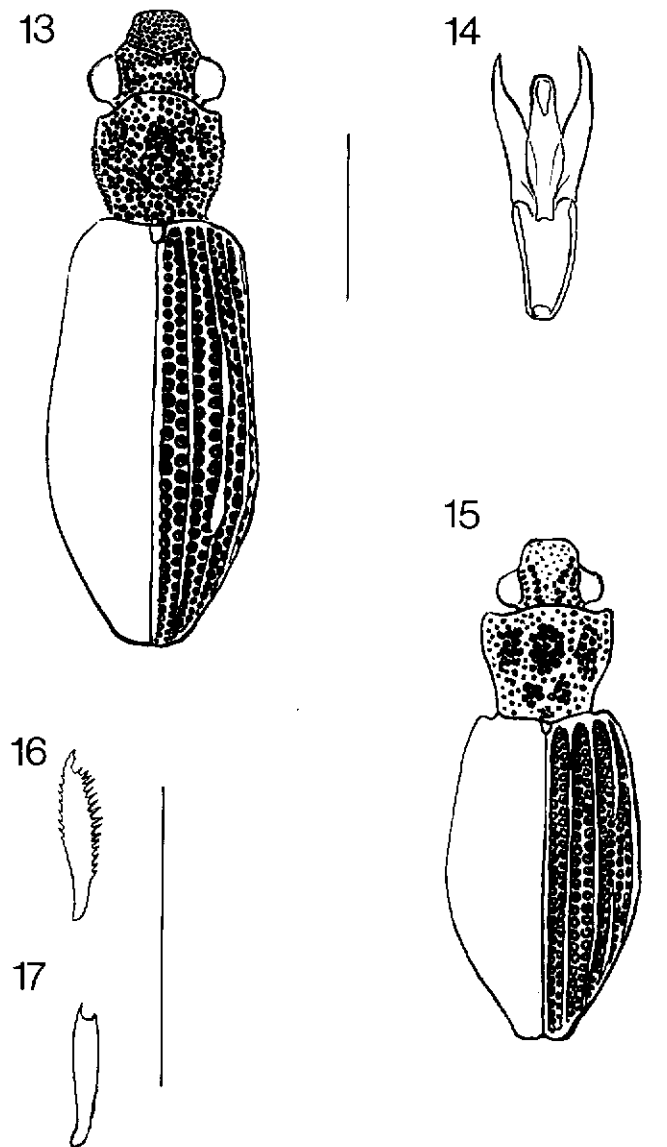
Clypeus testaceous, frons melanic. Dorsum with metallic iridescence, in holotype uniformly dark, in paratypes testaceous save for dark frons and scutellum. Legs testaceous with usual dark markings.

Clypeus smooth, shining, with fine sparse punctures. Frons with very coarse, irregular punctures. Pronotum strongly narrowed at base; sides convex in anterior 1/2, behind weakly concave. Depressions deep, densely punctured. Punctures on elytral striae coarse, contiguous, but rather shallow. Odd-numbered elytral interstriae raised into ridges as in figure 15; 1st and 3rd raised in most of their length; 5th without hump; 7th interrupted; 9th raised in most of its length, overshadowing 10th; 11th forming a strong ridge, angular in cross-section, with whitish, curving hairs. Elytral apices separately rounded, a little produced. Tibiae thick, narrowed at basal 1/3 and at apex, with series of long spines on apical 2/3 of outer edge forming a sort of brush or sole in lateral view (Fig. 16; cf. *H. richteri*, Fig. 17; also Figs 22, 28, 30).

Male genitalia unknown.

Material examined: Holotype from Brazil: Pará: Belén, "manatee basin" (Seekuh-Becken), 21.VI.1962, leg. Fittkau, in the MZUSP. Two paratypes (one teneral) from Brazil: Amazonas: "cachoeira do Igarapé Gigante" 200 m downstream from waterfall, near Manaus, 3-4.VII.1961, leg. FITTKAU in the MACN. The data kindly sent by Dr FITTKAU with the Hydrophiloid material from this expedition describe the biotope of the second capture as follows:

"Etwa 200 m. unterhalb des Wasserfalles, Wasser etwa 1-2 m tief, mässige Strömung. Steilufer mit feinen Wurzeln, leicht 'verstaubt'. That is: "About 200 m downstream from the waterfall, water about 1-2 m deep, current moderate. Banks steep with fine roots, lightly 'powdered' (sprayed?)". The depth of the water is interesting; this is not the usual habitat of *Hydrochus* species. The broad shape with carinate elytral margins suggest an adaptation to avoid being dislodged by a strong current.



Figs 13-14. *H. multicosatus* sp. n. 13: habitus view, 50 ×; 14: male genitalia, 100 ×.
Figs 15-16. *H. cristatus* sp. n. 15: habitus view, 50 ×; 16: fore tibia, 100 ×. Fig. 17:
H. richteri BRUCH, 1915: fore tibia, 100 ×.

Discussion: The name derives from latin *crista*, -ae, "ridge", in the adjective form, alluding to the raised odd-numbered elytral interstriae.

This species can be recognized at once by the raised elytral interstriae and the peculiar tibiae. The testaceous clypeus is also remarkable; I know of no other species of *Hydrochus* in which the dorsum of the head is not entirely melanic. The short oval shape and produced, rounded elytral apices are alike to those of *H. richteri*. This species, however, has the odd-numbered interstriae only weakly raised, save for the strongly convex 11th which is semicircular in cross-section, not carinate; the tibiae are thin, with minute spines, not visible under usual magnifications (Fig. 17).

Although, as a rule, describing a new species of Hydrophiloidea on females alone would not be good counsel, I think that the characters of sculpture, shape and tibiae allow for recognition of the species. I know of no species of *Hydrochus* in which dorsal sculpture is different in each sex.

Three species already described have distinctly spinose tibiae: *H. dewnaraini* MAKHAN, 1992 (Fig. 22), *H. zicsii* MAKHAN, 1993 (Fig. 30) and *H. pietersenae* MAKHAN, 1993 (Fig. 28); however, in the new species the spines are larger and thicker, the tibiae themselves more strongly narrowed at the basal third. The outer interstria in *H. cristatus* sp. nov. is very strongly costate, forming a ridge, and bears remarkable whitish hairs, such as I never have observed in other species of the genus. The general shape of the new species is broader than in any other save *H. richteri*. Moreover, in *H. dewnaraini* the odd-numbered elytral interstriae are not more strongly raised than the even-numbered ones, the pronotal sculpture is exceptionally coarse and the head is strongly melanic. In *H. zicsii*, the 4th interstria is raised as strongly as the 3rd or 5th and the head is also melanic. Both in the last species and in *H. pietersenae* the cost on interstria 7th is continuous, while it is distinctly interrupted in *H. cristatus*.

Hydrochus pseudosecretus sp. n.
(Figs 18, 19, 20)

Diagnosis: Large, elongate, last third of elytra abruptly narrowed. Dorsum grey, rarely dull gold, iridescent, with a few small black spots on elytra. Legs testaceous with usual apical dark marks. Pronotum very coarsely and densely punctured. Elytral striae with coarse punctures, round to polygonal. Interstriae narrower than striae, raised on stretches as in figure 18; 9th and 11th costate. Hump on 5th small but very strongly raised, not taking up 4th interstria which is separately raised. Elytral apices as in figure 19. Male genitalia as in figure 20.

Description: length: 4.0-5.7 mm. Shape broad, strongly broadened at 2/3 of elytral length, behind this rather abruptly narrowed. EI: 1.25-3.77. EI/Long: 0.22-0.96.

Dorsum lead-grey, sometimes dull gold, with many-coloured iridescence more apparent at bottom of punctures. Small black spots on elytra (Fig. 18), one on interstria 3rd, two on 5th. Legs testaceous, with apices of femora, tibiae and tarsi melanic.

Punctures dense, regular and moderate-sized on clypeus, on frons coarse

and rather irregular. Punctures on pronotum very coarse (3-4 times the size of ommatidia), dense. Disk raised; depressions deep, but often indistinct because of coarse punctures. Pronotum narrowed at base; sides weakly sinuate, smooth (coarse punctures giving an appearance of crenulation), with minute granules smaller than ommatidia. Punctures on elytral striae several times larger than those on pronotum, round, in several places polygonal because of their closeness. Interstriae narrower than striae, with minute granules smaller than ommatidia, raised as follows: 1st in most of its length; 3rd at base, briefly about middle of elytral length and quite strongly on elytral declivity; 4th for a stretch in front of hump on 5th interstria; 5th abruptly, forming a hump on usual place, and weakly midway between hump and base; 7th forming a small hump in front of that on 5th; 9th costate overhanging 10th, forming a small bulge at the middle of elytral length, in front of the hump on 7th; 11th costate. Dorsal sculpture with a considerable amount of intraspecific variation; however, the raised stretches can always be recognized. Elytral apices rounded and broadened, forming an outward angle, with an unpunctured, very finely granulated apical area, in which there is a single coarse puncture between striae 1st and 2nd (Fig. 19). In some specimens the ends of striae 4th to 6th are depressed into a groove. The apical area is 3-4 times as wide as the striae; the single puncture varies considerably in size.

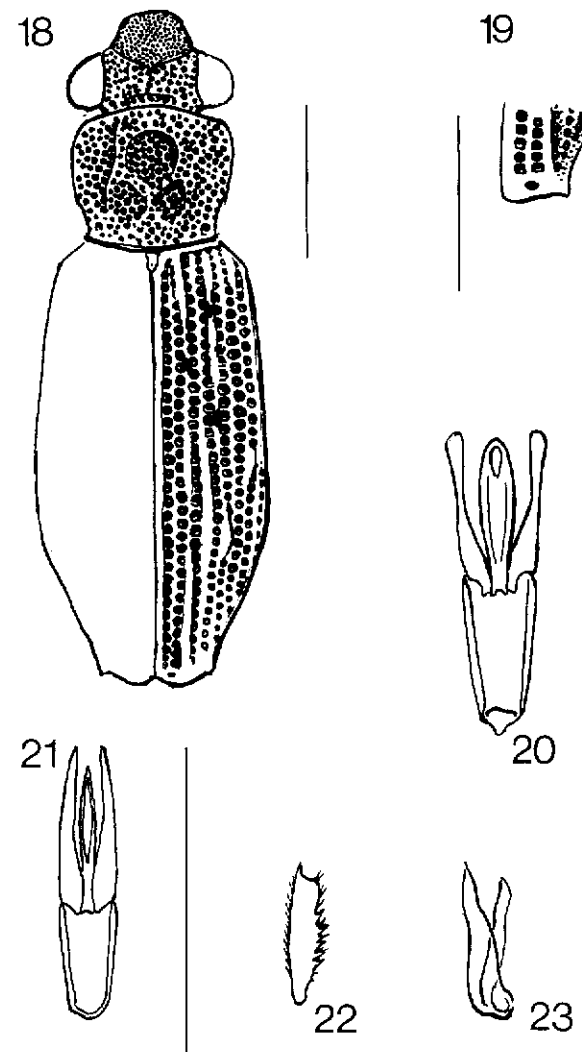
Male genitalia (Fig. 20): Basal piece about as long as distal ones, narrowed at base, symmetrical. Paramera with distal half narrower than basal half, weakly broadened and rounded at apices. Median lobe a little shorter than paramera, narrow at base, broadening towards apex which is broadly acuminate, with a small subapical fenestra.

Material examined: typical series from Venezuela: Barinas: Santa Bárbara, IV.1981, leg. H. MARTINEZ. Male holotype, allotype, 4 male paratypes and 2 female paratypes at the MACN; one paratype of each sex at the BM, the ZSM, the NMNH, the MZUSP and the IRSNB. Also a large series retained for anatomical studies. The condition of this material is not very good; specimens proved brittle although preserved in spirits.

Discussion: the name alludes to the resemblance of the new species to *H. secretus* KNISCH, 1921.

The two species can be easily distinguished by the hump on the 5th interstria, which in *H. secretus* takes up part of interstria 4th, while in *H. pseudosecretus* sp. n., although abruptly raised, it is small and does not take up the 4th interstria. The elytral apices are much alike in both species. The male genitalia suggest a close relation between both species. In *H. secretus* the basal piece is much shorter than the distal ones, asymmetrical at base; the paramera are wider, with the distal half not distinctly narrower than the basal half, only weakly broadened at apex.

H. pseudosecretus can be distinguished from *H. choenii* MAKHAN, 1992, by the 4th interstria, costate for a short stretch before the hump on the 5th, by the weak hump on the anterior part of 5th interstria (Fig. 18), by the distinctly angular elytral apices and by the male genitalia, especially the apices of the paramera, not sagittate. This is a clear-cut difference, not an intraspecific variation such as that of *H. obscurus*.



Figs 18-20. *H. pseudosecretus* sp. n. 18: habitus view, 40 ×; 19: elytral apex, 50 ×; 20: male genitalia, 100 ×. Fig. 21. *H. stolpi* GERMAIN, 1901: male genitalia, 100 ×. Fig. 22. *H. dewnaraini* MAKHAN, 1992, fore tibia, 100 ×. Fig. 23. *H. piroei* MAKHAN, 1992; male genitalia, distal pieces in lateral view, 100 ×.

3.3. Presence in Argentina of other species described for South America

H. metallipes KNISCH, 1921: Argentina: Misiones (ex coll. BREYER). Corrientes: rice field, 5.I.1984 leg. BRUQUETAS. Santa Fe: Salto Grande (Excursión CASTELLANOS Y YEPES), 14.VII.1924; Piquete, 2.I.1928 and 31.I.1930 (leg. BRIDAROLLI); Rosario, 12-15.XII.1980. Uruguay: Artigas: Barra del Yucutujá, 2.II.1952 (leg. CARBONELL). Paraguay: Concepción: Vallemí: riacho Mosquito, 28.VII.1952 (leg. BACHMANN); San Pedro: Carumbé, I.1971 (leg. GOLBACH). Also type series from the IRSNB: Holotype (labelled "typus") from Brazil: Mato Grosso: Corumbá; 17 paratypes (labelled "cotypus") from the same locality. Thirteen of these specimens were labelled "*Hydrochus tarsalis* CHEVROLAT" by HELLMAN. Without having seen the type of the latter species, it must be pointed out that the original description (CHEVROLAT, 1863) does not tally with that of *H. metallipes*. "...Prothorace... foveis quinque rotundatis 3, 2, media magna": this describes the type of pronotum most frequent in the genus, with a single, large median depression, not the pair of small antero-medial depressions characteristic of *H. metallipes*. Further on: "pedibus picco-ferrugineis": this eliminates KNISCH's species, which always has entirely black, iridescent femora. This character is so remarkable, that it seems improbable that it should have been overlooked.

H. ducalis KNISCH, 1920: Argentina: Formosa: Clorinda, 10.VIII.1978 (leg. ANGRISANO and BACHMANN); 15 km W of Clorinda, 13.VIII.1978 (leg. ANGRISANO and BACHMANN). Chaco: arroyo Ortega, 6.VIII.1978 (leg. ANGRISANO and BACHMANN). Santa Fe: near the Capital, XII.1970. Santa Fe: no locality, ex coll. Bosq. Buenos Aires: delta del Paraná: INTA 9-15.I.1978, 21-24.IX.1978, X.1980, 25-27.II.1981, 1.X.1981, 20-28.I.1982 (leg. BACHMANN); Buenos Aires city, 25.XII.1908 (leg. Bosq). Venezuela: Barinas: Santa Bárbara, IV.1981 (leg. H. MARTINEZ).

I must point out that my drawing (OLIVA, 1992 a) of the genitalia of *H. ducalis* shows the basal piece somewhat shorter than it is in fact. Going over my notes, I perceive that I mistakenly chose for publishing a drawing in which the basal piece had been broken at the base. This piece is actually longer than the distal pieces (about 3/5 of the entire length of the organ).

H. secretus KNISCH, 1920: Not found in Argentina. Type locality: Brazil: Mato Grosso. It should be expected to occur farther down the Paraguay river. Also at Bolivia: Beni (see *H. mahunkai* MAKHAN, 1993 in 3.4). The elytral apices have an unpunctured area as in *H. choenii* and *H. pseudosecretus* sp. n., with a coarse puncture placed between interstriae 2nd and 3rd.

H. variabilis KNISCH, 1920: Argentina: Chaco: arroyo Ortega, 6.VIII.1978 (leg. ANGRISANO and BACHMANN). Entre Ríos: Colón: Parque nacional El Palmar, 9.XI.1979 (leg. BACHMANN); XI.1980 (leg. ANGRISANO). Buenos Aires: delta del Paraná: INTA, 2.I.1973 (leg. BACHMANN). All at the MACN. Also, Argentina: Misiones: Iguazú, light-trap, 10.XII.1988 (leg. FOERSTER), 2 specimens at the NMW.

H. teunissenii MAKHAN, 1994: Argentina: Entre Ríos: Parque nacional El

Palmar, 9.XI.1979, leg. E. ANGRISANO; Uruguay: Canelones: ruta 8 and 11, near Soca, 10.I.1981, leg. A.O. BACHMANN; Maldonado: San Carlos, 20.I.1981, leg. A.O. BACHMANN. See discussion of species in 3. 4.

H. purpureus KNISCH, 1920. Argentina: Formosa: Tatané: río Salado, 6.VIII.1978 (leg. ANGRISANO and BACHMANN). Salta: Santa Victoria (E), 4-7.VI.1960 (leg. BACHMANN). Buenos Aires, no locality (leg. BRUCH); delta del Paraná, INTA, XII.1971 and 15.I.1978 (leg. BACHMANN).

H. obscurus SHARP, 1882: Argentina: Misiones: San Ignacio (leg. BA-DE). Formosa: 15 km W of Clorinda, 13.VIII.1978; Parque nacional Laguna Blanca, 7.VIII.1978 (leg. ANGRISANO and BACHMANN). Chaco: arroyo Ortega, km 1042, 6.VIII.1978, 11.VIII.1978 (leg. ANGRISANO and BACHMANN); San Bernardo, I.1981 (light-trap); 20-28.I.1982 (leg. DI IORIO). Entre Ríos: Ceibas, 23.III.1981; Victoria, 8-12.II.1982 (leg. OLIVA; light-trap); Colón: Parque nacional El Palmar, 9.XI.1979; Paranacito (no date). Buenos Aires: delta del Paraná: INTA, 9-15.I.1978; II.1979 (light-trap); 15.X.1980; II.1981; 9.X.1981; 15.VIII.1984 (leg. BACHMANN). Delta del Paraná, 8.XI.1953 (leg. BACHMANN); Tigre, 30.XI.1952, 17.XII.1952 (leg. BACHMANN); Palomar, 1.II.1953 (leg. BACHMANN); Chascomús, 29.X.1965, (leg. RONDEROS; on *Ceratophyllum demersum*). Uruguay: San José: Rincón de Arazati, 2.XI.1970 (leg. MORATORIO, WIBMER and MONNÉ); Lavalleja: Minas, XII.1981 (leg. OLIVA, on floating plants). Paraguay: Concepción: Vallemí: riacho Mosquito, 17.VII.1952 (leg. BACHMANN).

A species with remarkable intraspecific variation. Length usually 2.7-3.5 mm, but in Argentine, specimens as large as 4.7 mm are found mixed with the smaller ones, as remarked by BRUCH (1915) in his description of *H. corruscans* (= *H. obscurus*: see OLIVA, 1992a). He gives the length interval as 2.5-4.5 mm. I have observed a similar intraspecific variation in many species of Hydrophilidae.

H. drakei KNISCH, 1921: Argentina: Misiones: Loreto, 15.X.1950 (leg. KORMILEV). Formosa: Clorinda: río Pilcomayo, 10.VIII.1978 (leg. ANGRISANO and BACHMANN). Santa Fe: Santo Tomé, XII.1970. Paraguay: Concepción: Vallemí: riacho Mosquito, 21.V.1952, 1.VII.1952 (leg. BACHMANN). All at the MACN. Also, one specimen from Paraguay: Guairá: Garay, 20.VIII.1992 (leg. U. DRESCHER), from the NMW (det. as *metallipes* by MAKHAN, 1994).

H. drechseli MAKHAN, 1995: Argentina: Formosa: 5 km W of Clorinda, 10.VIII.1978 (leg. ANGRISANO and BACHMANN), Clorinda, same date and collectors. Also Paraguay: Itapúa: colonia Hohenau, 2.II.1982 (leg. DI IORIO); one female from Brazil: Mato Grosso: Salvaro, leg. CAMARGO, 1955 (HMNH). See discussion of species in 3.4.

H. richteri BRUCH, 1915: Argentina: Santa Fe: Garay: Colonia Mascías, X.1942 (leg. VIANA); Rosario (leg. STEVENIN). Entre Ríos: Victoria, 8-12.II.1982 (leg. OLIVA; light-trap). Buenos Aires: delta del Paraná: INTA, XII.1971 (iridescent), 2.I.1973 (iridescent), 9-15.I.1978 (mixed testaceous and iridescent), 21-24.II.1978 (iridescent), 21-24.IX.1978 (mixed testaceous and iridescent), 5.16.I.1979 (light-trap, iridescent), II.1979 (light-trap, iridescent), 27.IX.1980 (iridescent), 23-26.II.1981 (testaceous); 29-30.I.1982 (light-trap, iridescent) (leg. BACHMANN); Delta del Paraná: río

Sarmiento, VIII.1980, IV.1983 (leg. OLIVA; on *Salvinia*; testaceous); delta del Paraná, 2.II.1955 (leg. BACHMANN; pronotum with strong metallic sheen); Palomar, 15.VIII.1953 (leg. BACHMANN; pronotum iridescent); San Vicente, 2.I.1954 (testaceous), 13.X.1982 (iridescent) (leg. BACHMANN); Rauch, 29.VI.1931 (leg. DAGUERRE; testaceous). Also in Paraguay: Chaco (leg. FIEBRIG), 1 specimen from the NMW (see also *H. soesilae* MAKHAN, 3.4)

H. argutus KNISCH, 1920: Argentina: Formosa: 5 km W of Clorinda, 14.VIII.1978 (leg. ANGRISANO and BACHMANN). Buenos Aires: delta del Paraná: río Sarmiento, IV.1983 (on *Salvinia*), 1-3.IV.1983 (light-trap) (leg. OLIVA); INTA, II.1979 (leg. BACHMANN; light-trap). Bolivia: Santa Cruz: Monteros, VI.1960 (leg. A. MARTINEZ). Also Paraguay: Guairá (see *H. johannapietersenae* MAKHAN, 3.4).

H. pupillus ORCHYMONT, 1939: Argentina: Entre Ríos: Victoria, 8-12.II.1982 (leg. OLIVA; light-trap); Colón: Parque nacional El Palmar, XI.1982 (leg. DI IORIO). Buenos Aires: San Miguel, 20.XI.1933 (leg. WILLNER); delta del Paraná: INTA, 10-15.I.1982 (leg. BACHMANN; light-trap; large series). Paraguay: Itapúa: Colonia Hohenau, II.1982, leg. DI IORIO. Perú: Loreto: río Yarapa, 200 m from Puerto Miguel, 16-23.XII.1994, leg. T. Hacz and G. HOLZINGER, nine specimens from the HNHM, remarkable by the 3rd interstria costate in most of its length. This character varies within the species.

H. pumilio KNISCH, 1921: Entre Ríos: Paranacito; Victoria, 8-12.II.1982 (leg. OLIVA; light-trap; large series). Buenos Aires: F. Varela, 25.X.1965 (leg. BACHMANN); delta del Paraná: arroyo Caraguatá, 2.II.1955 (leg. BACHMANN); delta del Paraná: INTA, VII.1969, 5-15.II.1979 (leg. BACHMANN). Paraguay: Itapúa: Colonia Hohenau, II.1982 (leg. DI IORIO).

H. stolpi GERMAIN, 1901 (= *H. bruchi* KNISCH, 1924; syn. nov.): The type of *H. stolpi* at Santiago de Chile is extant only in the shape of microscopic slides used by GERMAIN to make drawings. These figures hardly show any character of diagnostic value at specific level. However, I received a loan of 13 specimens from Chile, all of them conspecific; this species is without doubt the same as *H. bruchi*. The latter had been recorded only from Neuquén province, but it appears in samples from the Delta del Paraná. It seems likely, therefore, that this is not so much a southern species, as a species which has extended southwards. However, it is just possible that the species has migrated down the río Negro and through the province of Buenos Aires only in recent years, due to man-produced changes. As to distribution in Chile, it suggests that the species passed from what is now Argentina along the tributaries of the Colorado and Negro rivers. South of 36°S, the Andes do not (save for a few peaks) rise more than 3,000 metres above sea level, the river valleys, of course, being much lower and offering some shelter to small organisms. The distribution resembles that of *Hemiosus dejeani* (SOLIER, 1849) (OLIVA, 1987). The latter has a wider distribution in Chile, as is to be expected from a more active insect, and has not spread north-eastwards in Argentina, probably because it is associated with sandy or gravelly bottoms, not found in the Pampean plain.

Male genitalia (Fig. 21): Basal piece short, about 2/5 of total length, weakly asymmetrical at base. Paramera narrow, gradually acuminate. Median lobe a little shorter than paramera, narrow, acuminate, with long subapical fenestra.

Argentina: Río Negro: Bariloche: km 12, 14.VI.1981 (leg. BACHMANN). Buenos Aires: delta of the Paraná: INTA, XII.1971, 5-15.II.1978, 27.IX.1980, 22.XI.1981 (leg. BACHMANN). Chile: Valparaíso, 5.I.1969, (leg. J. SOLERVICENS); Quillota, 7-1897; 1 specimen without data. All specimens from Chile at the MNHNS. Length: 2.70-3.35 mm. EI: 3.77-4.46. EI/Long: 0.46-1.39. EI of holotype of *H. bruchi*: 4.98 (OLIVA, 1992a). A species of moderate size, of elongate but not particularly narrow shape. Dorsum melanic, in Chilean specimens with strong, many-coloured metallic sheen; in Argentinian specimens with weak iridescence or shining black. Tibial spines appearing as fine bristles under 50 ×.

H. piroei MAKHAN, 1992: see next section. The holotype of *H. merkli* MAKHAN, 1993 (= *H. piroei*) is from Misiones: Iguazú.

3.4. Revision of species described by MAKHAN

Since 1992, MAKHAN has published several new species of *Hydrochus* from South America. The brief descriptions and careless genitalia drawings hardly allow recognition of species. I examined the types of all these species save *H. iduae*. Many specimens were still thickly encrusted. Also, the author had glued the genitalia to cards or to celluloid strips pinned together with the specimen; in some cases I was unable to find the dissected parts. In other cases it was necessary to remove the pieces and store them in a more orthodox fashion; in the case of *H. merkli*, at the ZMA, this was not allowed by regulations. The genitalia were quite brittle and appeared to have been treated with alkali.

Hydrochus choenii MAKHAN, 1992

(= *H. sagittatus* HELLMAN in coll.)

Size large, shape broad, abruptly narrowed behind, with broadened elytral apices; hump on fifth elytral interstria remarkably high. Dorsum grey, iridescent. Male genitalia with characteristic sagittate apices of paramera. I have in my notes a drawing of a specimen at the IRSNB, labelled "*H. sagittatus* sp. n." by HELLMAN, who never published the species (1975); this appears to be the same as *H. choenii*. Material examined: male holotype from Suriname: Paramaribo, 7.VIII.1984, leg. D. MAKHAN. EI: 3.33. EI of *H. secretus* (type series): 2.40-4.57 (OLIVA, 1992 a). EI of *H. pseudosecretus* sp. n.: 1.25-3.77. This species probably is found in Venezuela; I have examined a specimen from Barina: Santa Bárbara, IV.1984 leg. H. MARTÍNEZ, which presented such peculiar sagittate paramera; unfortunately, the badly preserved specimen fell apart.

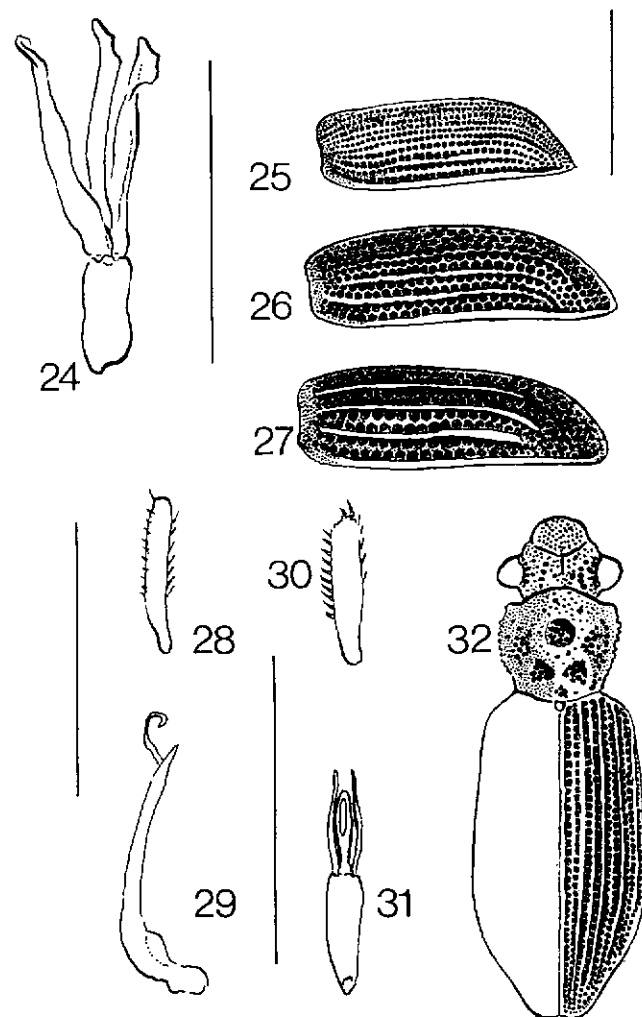


Fig. 24. *H. battjai* MAKHAN, male genitalia. Fig. 25. *H. baloghi* MAKHAN, outer elytral interstriae showing regular shape, 7th not costate, 50 ×. Figs 26, 28, 29. *H. pieterseae* MAKHAN. 26: outer elytral interstriae showing 7th costate, 9th not swollen on posterior half, 50 ×; 28: fore tibia, 100 ×; 29: male genitalia, 100 ×. Figs 27, 30-32. *H. zicsii* MAKHAN. 27: outer elytral interstriae showing 9th swollen on posterior half, thicker than costate 7th, 50 ×; 30: fore tibia, 100 ×; 31: male genitalia, 100 ×; 32: habitus view, 50 ×.

Hydrochus ramcharani MAKHAN, 1992

(= *H. drakei* KNISCH, 1920 **syn. nov.**)

This species appears to be based on small specimens of *H. drakei*. I have found no characters that mark *H. ramcharani* as a distinct species. The apices of the paramera are not so clearly sagittate as in most specimens of *H. drakei*, but a certain intraspecific variability is observed in several species (cf. *H. obscurus*). The elytral interstriae (inner ones convex, with an abrupt hump on the fifth; outer ones costate, the 9th overhanging the 10th in most of its length) are distinctive. Material examined: male holotype and one paratype from Suriname: Paramaribo, 7.VIII.1984, leg. D. MAKHAN. EI of paratype: 2.77. EI of *H. drakei* (type series): 2.72-6.58 (OLIVA, 1992a).

Hydrochus battjai MAKHAN, 1992

(Fig. 24)

This species greatly resembles *H. purpureus* KNISCH, 1920, specially in the shape of the genitalia. However, as far as I can see, in MAKHAN's species the median lobe is subcylindrical, with the apex weakly angular in lateral view and some indication of a weak apical ridge (Fig. 24), while in *H. purpureus* the median lobe is spindle-shaped, with a straight apex. The basal piece is distinctly shorter in proportion to the distal ones in MAKHAN's species. Moreover, the punctures on the inner interstriae are round and moderately close in *H. battjai*, square and remarkably contiguous in *H. purpureus*. The ninth elytral interstria overhangs the 10th in most of its length in MAKHAN's species and has no bulge about the middle; in KNISCH's species the 9th overhangs 10th only in the anterior half and has a small bulge about the middle. I saw the holotype from Suriname: Paramaribo, 7.VIII.1984, leg. D. MAKHAN. It was not possible to calculate the EI as one elytron had been removed.

Hydrochus piroei MAKHAN, 1992

(Fig. 23)

(= *H. beeneni* MAKHAN, 1992 **syn. nov.**; Fig. 23)

(= *H. bruggei* MAKHAN, 1992: MAKHAN, in coll. **syn. nov.**)

(= *H. merkli* MAKHAN, 1993 **syn. nov.**)

(= *H. ramdhanii* MAKHAN, 1995 **syn. nov.**)

I saw the holotype and one paratype of *H. piroei*, from Suriname: Paramaribo, 7.VIII.1984, leg. D. MAKHAN. This species resembles the smaller specimens of *H. obscurus*. However, I could not detect a subapical ridge on the median lobe of the male genitalia; on the other hand, this lobe is not acute, nor is it quite as long as the paramera, as in *H. orchymonti* sp. nov. (see Figs 5, 6, 23) *H. piroei* also differs from *H. obscurus* in the 9th elytral interstria, which does not form a bulge in the middle of the elytral

length and is hardly wider than the 10th on its posterior half; from *H. orchymonti* n. sp. by a slightly broader shape and by the 5th interstria, which is not raised at base and forms a small elongate hump (in *H. orchymonti* it is only costate). The type of *H. bruggei* MAKHAN (from Brazil: Mato Grosso) had been labelled "coruscans" by KNISCH. MAKHAN himself has crossed out his own determination of 1990 as *bruggei* and added a red label "*Hydrochus piroei* MAKHAN 1993". After checking the median lobe of the male genitalia, I see no justification in making this a different species from *H. piroei*. I saw as well the holotype of *H. beeneni*, from Cayman Islands, "Cayman Brac". The genitalia (Fig. 23) leave no doubt that this is the same species as *H. piroei*, distinct both from *H. obscurus* and from *H. orchymonti* n. sp. in spite of the unusually wide geographic range. The holotype of *H. merkli* MAKHAN, 1993, from Argentina: Misiones: Iguazú, XI.1986, leg. R. FOERSTER, corresponds to *H. piroei* in its external characters. The paramera have weakly sagittate apices, and this would suggest a small specimen of *H. obscurus*. Rules of the ZMA do not allow to remount the male genitalia. Fortunately, I have a very characteristic specimen of *H. obscurus* from Misiones (ex coll. BREYER), and I have been able to compare the two specimens. In *H. obscurus* the inner elytral interstriae are quite flat at base, the hump on 5th is strongly raised, the 9th forms a distinct bulge and overhangs the 10th for a short stretch behind the humeral hump, the elytral apices are angular subapically, the basal piece of the male genitalia is asymmetrical at base and hardly shorter than the distal pieces. In the type of *H. merkli* the inner elytral interstriae are weakly costate at base, the hump on 5th is indistinct, there is no bulge on 9th, which does not overhang 10th, the elytral apices are rounded, the basal piece is symmetrical at base and, contrary to MAKHAN's original description, distinctly shorter than the distal pieces. I think that the distinction between *H. obscurus* and *H. merkli* is justified, and that *H. merkli* is conspecific with *H. piroei*. MAKHAN (i. litt.) states that the two last species differ in size and in the basal piece of genitalia. The size, as said, varies within one species; besides, according to MAKHAN himself, the holotype of *H. piroei* is 2.9 mm long, and that of *H. merkli* 3.0 mm: hardly what one would call a significant difference. As for the shape of the basal piece, it appears to me that manipulation of the genitalia, which I found already in a brittle state, had produced a certain distortion. Even if we trust MAKHAN's own drawings, the basal pieces of both *H. piroei* and *H. merkli* are symmetrical and about 2/5 of the total length of the genitalia. The type and paratypes of *H. ramdhanii*, at the NMW, are respectively 3.4 and 3.2 mm long. The genitalia of the holotype are dissected and dry-mounted. I think that both these and the elytral sculpture correspond to *H. piroei*. The EI are as follows: Holotype of *H. piroei*: 1.75; holotype of *H. beeneni*: 2.50; holotype of *H. merkli*: 1.75; holotype of *H. bruggei*: 3.22; holotype of *H. ramdhanii*: 2.27. EI of *H. obscurus*: 1.75-5.88 (OLIVA, 1992a). EI of *H. orchymonti* sp. n.: 3.36-7.58. In spite of great intraspecific variability, the EI reflects roughly the elongate shape of the new species.

Hydrochus soekhnandanae MAKHAN, 1992

(= *H. pupillus* ORCHYMONT, 1939 syn. nov.)

The genitalia of the male holotype correspond with those of *H. pupillus*. Both the holotype and a paratype I have examined show the short body shape, the unusually bright emerald green colour of the whole dorsum, the 3rd elytral interstria raised alongside the raised stretch of 5th (Fig. 7), and the very convex 10th interstria, characteristic of ORCHYMONT's species.

Hydrochus dewnaraini MAKHAN, 1992

(Fig. 22)

This species is easy to recognize by the unusually coarse (2-4 ommatidia) and thick punctures on head and pronotum; there are other species with pronotal punctures quite as coarse, but it is remarkable that the frontal punctures are quite (or nearly) as coarse as the pronotal ones. The punctures on the elytral striae are coarse, square; the interstriae narrow, costate, but the even-numbered ones about as strongly raised as the odd-numbered ones. I have also observed some long, light-coloured spines on the outer margin of the tibiae; the inner margin bears a row of much shorter spines, which, however, are quite distinct under 100 × (Fig. 22). This character is shared by *H. cristatus* sp. nov., which can be distinguished because the tibiae are narrowed in the basal third, by the broad body shape, by the produced elytral apices and by the more strongly costate odd-numbered elytral interstriae, of which the 7th is interrupted (Fig. 15); in MAKHAN's species, the odd-numbered interstriae are hardly more strongly raised than the even-numbered ones, except for stretches of 5th and 9th, and the weak raising of the 7th is not interrupted. MAKHAN's diagnosis of a "swollen medial part of the frons" is not quite accurate; it is the coarseness of the frontal punctures (forming a pair of rows parallel to the inner margin of eyes) which produces that appearance. See also discussion of *H. zicsii* and *H. pietersenae*. Material observed: female paratype, from Suriname: District Commewijne, 5.VIII.1984, leg. D. MAKHAN. EI: 2.89.

Hydrochus rattanae MAKHAN, 1992

(= *H. pumilio* KNISCH, 1920 syn. nov.)

The male holotype of *H. rattanae* shows every character of *H. pumilio*: sides of the prothorax straight, with small granules, 9th elytral interstria overhanging 10th on anterior half, male genitalia with narrow paramera turned inwards at the apices and with median lobe broad, blunt, hardly shorter than paramera. The brittle condition of the genitalia made observation rather difficult. Although colour is not entirely reliable as a character, it must be pointed out that the holotype of *H. rattanae* shows the pattern most frequent among specimens of *H. pumilio*: deeply melanic head with

strong metallic sheen, pronotum and elytra dark, with very weak iridescence. Indeed, this does not agree with the original description of *H. rattanae*, which implies that the whole dorsum is about the same colour. The paratypes appear to be a different species, but the whole type series should be examined before they are determined with any certainty.

Hydrochus vanbergehenegouweni MAKHAN, 1992

(= *H. obscurus* SHARP, 1882 syn. nov.)

The holotype of *H. vanbergehenegouweni* (from Venezuela: Enconrados) is badly encrusted; I managed to clean it enough to see that the inner interstriae are not costate at base, and that the 9th interstria is distinctly wider than the 10th, bulging out about the middle of the length, although the bulge is not as distinct as in typical specimens of *H. obscurus*. The basal piece of the male genitalia is not so clearly asymmetrical at base as in most specimens of SHARP's species, and this made me suspect a synonymy with *H. piroei*. However, the paramera are dilated subapically in a degree consistent with variation within *H. obscurus*; what is more important, the median lobe shows in lateral view an indication of the subapical membranous ridge shown in figure 6. It was not possible to take the EI of *H. vanbergehenegouweni*, as the holotype has had the right elytron removed. I repeat that in considering both *H. obscurus* and *H. piroei*, two species having an extense geographical dispersion, one should allow for some degree of intraspecific variation.

Hydrochus beeneni MAKHAN, 1992

See *H. piroei* MAKHAN, 1992

Hydrochus desenderi MAKHAN, 1992

(= *H. ducalis* KNISCH, 1921 syn. nov.)

I have seen the holotype from Brazil: Porto Alegre, ex coll. KNISCH. It is a teneral specimen of *H. ducalis*, with the femora weakly melanized; male genitalia seen (see discussion of *H. ducalis* in 3.3). EI: 11.43. EI of *H. ducalis*: 6.94-14.22 (OLIVA, 1992a).

Hydrochus coeneni MAKHAN, 1992

This species resembles *H. pumilio* in general appearance, but the elytral interstriae are wider, about 1/2 of the striae; the raised parts of the interstriae are alutaceous as in *H. multicosatus* sp. n.; the 9th interstria is swollen without forming a median bulge, and it overhangs the 10th on most of its length (see discussion of *H. soekhnandanae* for external characters of *H. pupillus*). The male genitalia of *H. coeneni* have a slender median lobe, much shorter than the narrow paramera, which are not turned

inwards at the apices. In *H. pupillus* the median lobe is thick, rather shorter in relation to the paramera than in MAKHAN's species. Material examined: Holotype from Brazil (no locality or date). EI: 4.31. EI of *H. pupillus*: 2.53-4.76 (OLIVA, 1992 a).

Hydrochus bruggei MAKHAN, 1992

See *H. piroei* MAKHAN, 1992

Hydrochus merkli MAKHAN, 1993

See *H. piroei* MAKHAN, 1992

Hydrochus jethoeae MAKHAN, 1993

This smallish species belongs with *H. obscurus* and allied species because of the small but distinct hump on the 5th interstria, on front of which the 4th is costate; also because of the male genitalia resembling those of *H. purpureus*, if MAKHAN's drawing is to be given credit. The strongly costate 9th interstria overhangs the 10th in nearly the whole of its length. However, the original description states that the 9th is "flat" and that there is no hump on the 5th. Neither are the pronotal sides "straight", but convex and sinuate as is most frequent in the genus. The pronotal depressions are shallow, but well-marked, with rather coarse, dense, regular punctures. The colour of the whole dorsum is black with metallic iridescence. I was unable to find the genitalia illustrated by the author, which should have been glued to a strip of celluloid which was pinned through by the pin bearing the Holotype. However, the round punctures of the inner interstriae and the 9th interstria overhanging 10th in its whole length set *H. jethoeae* apart from *H. purpureus*, which has a male genitalia of a similar shape, although with the basal piece longer in proportion. Material examined: male Holotype from Suriname: District Commewijne, 7.VIII.1992, leg. D. MAKHAN, at the HNHM. EI: 1.12.

Hydrochus jialalae MAKHAN, 1993

(= *H. drakei* KNISCH, 1920 syn. nov.)

Material examined: male Holotype from Suriname: District Commewijne, 7.VIII.1992, Leg. D. MAKHAN, at the HNHM. Broken in two; rather small, but elytral sculpture distinct. EI: 2.09. EI of *H. drakei*: 2.72-6.58 (OLIVA, 1992a)

Hydrochus baloghi MAKHAN, 1993
(Fig. 25)

This small species can be distinguished from *H. pumilio* KNISCH, 1920 by the shorter shape, by the broad, squarish pronotum with dense punc-

tures (not or hardly larger than those on frons, as dense between depressions as on these), by the elytral interstriae about 1/2 of the width of striae (Fig. 25) and by the male genitalia: basal piece much shorter than the distal ones; apices of the paramera smoothly curving, not abruptly turned inwards. In MAKHAN's species the dorsum is black (sometimes very dark brown on elytra), with a weak iridescence on the head alone. Most specimens of *H. pumilio* are dark brown with strong metallic sheen on the head. The striae punctures are squarish and remarkably regular, the interstriae being quite straight in shape (Fig. 25). Material examined: male Holotype and six Paratypes, labelled: "Soil Zoological Exp. /BOLIVIA, Guayaramerin/ Beni/outskirts of town/ BALOGH, MAHUNKA, ZICSI". EI of holotype: 3.73.

Hydrochus mahunkai MAKHAN, 1993

(= *H. secretus* KNISCH, 1921 syn. nov.)

Material examined: male Holotype, labelled: "Soil Zoological Exp./BOLIVIA, Guayaramerin/ Beni/outskirts of town/ BALOGH, MAHUNKA, ZICSI". Median lobe of male genitalia appearing narrower than in my own drawing (OLIVA, 1992a); I think this is because I made my drawings between slides to ensure good representation of the apices of distal pieces; on the other hand, MAKHAN glued the genitalia of his material to strips of celluloid, and most of the pieces appear to have dried, causing a shrinking of membranous parts. The large hump taking up both 4th and 5th interstriae is diagnostic. EI: 1.43. EI of *H. secretus*: 2.40-4.57 (OLIVA, 1992a).

Hydrochus pietersenae MAKHAN, 1993
(Figs 26, 28, 29)

This species is remarkable by the narrow, raised elytral interstriae. However, the pronotum is not "trapeziform", the sides being distinctly sinuate, with a few small granules. The striae punctures are large, dense, reaching between punctures of the adjacent stria, so that even-numbered interstriae are zigzagging; the odd-numbered interstriae are straight, costate; the 4th is costate only at base, not on disk as in *H. zicsii*; the 7th is continuously costate, not interrupted as in *H. cristatus* sp. nov.; the 9th overhangs the 10th in all its length, but is not swollen behind as in *H. zicsii*, so that it is about the same width as the 7th (Fig. 26; compare Fig. 27). The tibial spines are apparent under ordinary magnification (Fig. 28; compare Figs 16, 22, 30). The male genitalia are unique for the genus (Fig. 29). As far as I can see, the basal piece forms a long, curved tube; at the apex appear what may be the shortened paramera; I did not risk further manipulation of the available material. The colour of the dorsum varies considerably. The Holotype is black with iridescence; some paratypes are blackish, other strongly iridescent, one has a brightly metallic head and pronotum with testaceous elytra. Material examined: male Holotype and 13 Paratypes, labelled: Soil Zoological Exp. / BOLIVIA, Guayaramer-

rin / Beni/ river bank (Holotype and 2 Paratypes) (or: outskirts of town: 8 Paratypes) (or: Mamoré river: 3 Paratypes) / BALOGH, MAHUNKA, ZICSI". EI of holotype: 1.98. Also a single female from Paraguay: Puerto Stroessner, 26.29.XII.1965, leg. Mahunka et Zicsi. All at the HNHM.

Hydrochus jenniferiduae MAKHAN, 1995

(= *H. zicsii* MAKHAN, 1993 syn. nov.)

Hydrochus zicsii MAKHAN, 1993
(Figs 27, 30-32)

This is the smallest species of *Hydrochus* known so far for South America. According to my own measurement, the male holotype is only 1.8 mm long; the Holotype of *H. jenniferiduae* is 2.2 mm long; the paratypes 1.9-2.4 mm. The thick, spinose tibiae (Fig. 30) and costate odd-numbered interstriae (Fig. 27) place this species near *H. dewnaraini*, but in *H. zicsii* the 4th interstria is raised to the level of the 3rd or the 5th, which however are strongly costate (Fig. 32); the 9th is swollen behind and thicker than the 7th, which is strongly costate and not interrupted (Fig. 27). *H. zicsii* also resembles *H. pietersenae*; the diagnostic characters are given in the discussion of the second species. The spines on the tibiae of the Holotype appear under 100 × as a thick row of bristles, because of the small size; this character was overlooked by the author of the species. The sculpture is not as coarse as on *H. dewnaraini*, or to be precise, it becomes gradually coarser backwards as in most species of *Hydrochus*, instead of being as coarse on frons as on pronotum. The punctures on the clypeus are about 2 times as large as an ommatidium, on frons 3 times, on pronotum 4-6 times. The sinuate sides of the pronotum bear granules 1-2 times the size of ommatidia. Elytral apices rounded taken together, not separately as in *H. cristatus* sp. nov. Dorsum melanic, in holotype with weak iridescence. Male genitalia (Fig. 31): basal piece about 3/5 of total length; paramera narrow, acuminate, weakly sinuate; median lobe shorter than paramera, blunt. Material examined: male Holotype, labelled: "Soil Zoological Exp./BOLIVIA, Guayaramerin/ Beni/outskirts of town/ BALOGH, MAHUNKA, ZICSI." EI: 3.0. Types of *H. jenniferiduae* MAKHAN, 1995, from the NMW; male holotype and 11 paratypes from Paraguay: Paraguari: Sapucay, 4.X.1992, leg. U. DRESCHER; also 10 additional specimens. EI: holotype: 4.50; paratypes: 2.0-4.27. The shape is narrower than in *H. cristatus* sp. nov.

Hydrochus radhakishunae MAKHAN, 1994

(= *H. pumilio* KNISCH, 1920 syn. nov.)

Male genitalia, with basal piece about the same length as distal ones, paramera narrow with apices turned inwards, median lobe thick, as long as paramera, rounded at apex, correspond to *H. pumilio*. MAKHAN's drawing

is not correct, showing as it does a much shorter basal piece. The long shape is also most characteristic, as well as the trapeze-shaped pronotum and the metallic sheen restricted to upper head. I did not see the "blue-green metallic gloss" mentioned in the original description; elytra of the holotype are dark brown rather than black. I saw the holotype and 4 paratypes, all males, from Paraguay: Asunción, at the MNB.

Hydrochus teunissenii MAKHAN, 1994
(Figs 10, 11)

I had found this species in Argentina and considered it new to science in a first draft of the present paper. As it appears to be rare, it seems worthwhile to give an extensive description, the more so as MAKHAN's is brief and his drawing of the genitalia not clear.

Size moderate. Length: 2.6-3.4 mm. Shape rather narrow. EI: 1.25-3.27. EI/Long: 0.96-1.07. Measures taken on material from Argentina; holotype rather larger: 3.5 mm. Dorsum melanic; specimens from Argentina and Uruguay with metallic iridescence, which may be limited to the bottom of punctures, or may be stronger on head and pronotum. One specimen with elytra weakly melanic, showing darker spots. Holotype from Paraguay with black, iridescent head, the rest of the dorsum dark brown, not iridescent contrary to description. A female from Brazil deep black, without iridescence. Legs testaceous with usual melanic areas.

Clypeus with dense, regular, moderate-sized punctures; frons with rather coarse, deep punctures in two paramedial rows (besides usual rows of trichobotria along inner margins of eyes), in holotype also punctate between these. Pronotum narrowed at base; disk not or hardly raised; depressions shallow, with coarse, very dense punctures; the rest of the disk with moderately dense, fine punctures and a few coarse ones. Sides of pronotum convex, with hair-bearing punctures which makes them appear very finely granulated. Elytral striae with large punctures; interstriae narrow, at some points zigzagging, convex. Hump on 5th interstria weak, usually reduced to a costate stretch; 9th swollen on posterior half, weakly overhanging 10th in most of its length. Elytral apices separately rounded. Male genitalia as in figure 11: Basal piece short, narrowed at base. Paramera narrow, gradually acuminate, with apices weakly curving inwards. Median lobe shorter than paramera, moderately thick, acuminate at apex, with small subapical fenestra.

Material examined: Holotype from Paraguay: Asunción, at the MNB. The label reads: "Paraguay, 1912/cobecionados en/Asuncion/Leg. A. Barbero". (Beginning of the second line obviously an erratum for "coleccionados" = "collected"). I removed very carefully the genitalia glued to the same card as the beetle and, after drawing them, stored them in a microvial in glycerine in the usual manner. Not only was it impossible to recognize the genitalia under their original presentation, but they ran a severe risk of mechanical damage. Also: Argentina: Entre Ríos: Parque nacional El Palmar, 9.XI.1979, leg. E. ANGRISANO; Uruguay: Canelones: ruta 8 and 11, near Soca, 10.I.1981, leg. A.O. BACHMANN. One female

(weakly melanized) from Uruguay: Maldonado: San Carlos, 20.I.1981, leg. A.O. BACHMANN. All at the MACN. Also: a female from Brazil: Mato Grosso: Salvara, I.955, at the HMNH. It may be difficult to distinguish *H. teunissenii* from *H. purpureus* KNISCH, 1920; the last species has a distinctly raised 9th interstria which overshadows the 10th on the anterior half of the elytra and the hump on 5th is usually small but distinct. Also, the male genitalia should be considered (see Figs 11, 12). *H. variabilis*, *H. purpureus* and *H. teunissenii* appear to be rather rare in Argentina; they have been found together at the same date and locality.

Hydrochus elsjeae MAKHAN, 1994

(= *H. obscurus* SHARP, 1882 syn. nov.)

Material examined: Holotype from Bolivia: Sara, 750 m, J. STEINBACH, at the MNB). Both the male genitalia and the elytral sculpture agree with *H. obscurus*.

Hydrochus soesilae MAKHAN, 1994

(= *H. richteri* BRUCH, 1915 syn. nov.)

The male genitalia show clearly the synonymy. MAKHAN (i. litt.) states that *H. richteri* is a larger species than *H. soesilae*. However, the length range I gave in 1992 for *H. richteri* was 1.7-2.3 mm; the original description of *H. soesilae* gives the length of the male holotype as 2.4 mm. MAKHAN also claims that the median lobe of *H. richteri* is parallel-sided and that my own illustration (OLIVA 1992, Fig. 30) corresponds to his species. Undoubtedly, synonymy is in part a matter of opinion, but I may point out that my drawing is based on type-series material, that I examined abundant material, most of it from the typical locality, and that the frail genitalia of small *Hydrochus* are easily distorted by drying and/or alkali, producing small variations which should not be taken as specific characters.

Hydrochus ramdhanii MAKHAN, 1995

(see *H. piroei*)

Hydrochus drechseli MAKHAN, 1995

(Figs 8, 9)

I had considered this as a new species in a first draft of the present paper. As with *H. teunissenii*, I think that a redescription is desirable.

Size moderate to large. Length: 3.2-4.2 mm. Shape elongate, narrow. EI: 3.84-9.78. EI/Long: 1.0.-2.64.

Dorsum melanic, with rather weak, many-coloured metallic sheen. Clypeus with fine (about 1 ommatidion), dense, regular punctures; frons with

very coarse punctures forming a basal median pit and two paramedial rows, in addition to the usual rows of trichobothria along inner margins of eyes; the rest of frons raised, smooth. Pronotum squarish, a little narrowed at base; disk weakly raised; depressions rather small, with coarse, rather dense punctures; the rest of the disk smooth, with sparse punctures. Elytral striae with round contiguous punctures, a little larger than those on the depressions on the pronotum. Interstriae weakly convex, on elytral disk about 1/2 of width of striae; hump on 5th shallow, elongate, 4th weakly raised in front of this hump and alongside it; 7th and 8th not costate save at the very base, less convex than 9th which is raised, swollen, distinctly wider than 10th which it overhangs between 1/4 and 1/2 and in part on posterior half. Holotype from Asunción and 3 specimens from Formosa with 9th distinctly and strongly costate in the whole of its length; in other specimens outer interstriae less strongly raised, although the genitalia leave no doubt as to the identity of the species. Elytral apices rounded (taken together); striae punctures reaching very close to margin.

Male genitalia (Fig. 9): Basal piece slightly longer than half of total length, asymmetrical at base. Paramera narrowed on apical half, apices narrowly rounded. Median lobe much shorter than paramera, thick, narrowed on apical half, with apex broadly rounded; a large subapical fenestra.

This species has a superficial likeness to *H. metallipes* due to elongate shape, but it is easily distinguished by the pronotum, a little narrowed at base and carrying the single, rounded median depression which is most usual in the genus, while *H. metallipes* and *H. ducalis* have a pair of small shallow depressions. A trained eye will distinguish at once *H. drechseli* from any other species in Argentina by its shape (Fig. 8). Material examined: Holotype from Paraguay: Asunción, 9.I.1992, at the NMW. Also: Argentina: Formosa; Paraguay: Itapúa (MACN); Brazil: Mato Grosso (HMNH)

Hydrochus johannapietersenae MAKHAN, 1995

(= *H. argutus* KNISCH, 1921 syn. nov.)

The subapical crescent-shaped depressions on the elytra, the peculiar male genitalia with a very long basal piece and a thick median lobe much longer than the small paramera, the median bulge on 9th interstria and the broad shape are very characteristic of *H. argutus*. I examined the Holotype of *H. johannapietersenae* from Paraguay: Guairá: Zorrilla, 16.20.X.1992, leg. U. Dreschel, at the NMW. Length: 2.9 mm; EI: 3.36. Length of *H. argutus*: 2.5-2.6 mm; EI: 2.53-4.76 (OLIVA, 1992 a).

Hydrochus jenniferiduae MAKHAN, 1995

(= *H. zicsii* MAKHAN, 1993 syn. nov.)

4. Discussion: a tentative arrangement of the South-American species

The South-American fauna of *Hydrochus* can be grouped into four species-complexes, plus a few species which appear to have evolved along independent lines.

1- Male genitalia: paramera narrow, apex dilated or not; median lobe acuminate, more or less spindle-shaped, with subapical membranous fenestra very large. Size moderate. Shape sturdy to elongate, hump on 5th interstria usually large. Geographic dispersion ranging from the Caribbean area to the Paraná basin, one species along río Negro basin, reaching central Chile. *H. obscurus*, *H. drakei*, *H. purpureus*, *H. stolpi*, *H. piroei*, *H. battjai*, *H. teunissenii* (in spite of smallish fenestra), *H. orchymonti* sp. nov. Perhaps *H. variabilis* and *H. jethoeae*.

2- Male genitalia: paramera narrow, apex acuminate, not or weakly broadened; median lobe thick, fenestra large. Size small, hump on 5th interstria minute or absent. Possibly a radiation based on different length ratio of basal/distal pieces and of paramera/median lobe. Geographic dispersion: South America, as far south as the gallery forest of the Paraná and río de la Plata. *H. pumilio*, *H. argutus*, *H. pupillus*, *H. beeneni*, *H. baloghi*, *H. richteri*, *H. zicsii*, *H. cristatus* sp. nov.; probably *H. dewnaraini*; perhaps *H. pietersenae* in spite of the abnormal male genitalia. The sturdy tibiae with long spines in *H. dewnaraini*, *H. pietersenae*, *H. zicsii* and *H. cristatus* sp. n. may be due to secondary adaptation. Comparing the genitalia should clear up this question; however, one of the species has abnormal genitalia, and two other are only known up to this moment through females.

3- Male genitalia: paramera narrow, apex weakly broadened to sagittate; median lobe thick, fenestra small. Size large, shape broad, strongly narrowed behind. Pronotal punctures coarse, thick; hump on 5th elytral interstria very strongly raised in described species. Tropical South America. *H. secretus*, *H. choenii*, *H. pseudosecretus* sp. nov. Perhaps a fourth species: a single female from Uruguay (Rivero: Sierra de la Aurora: Arroyo de la Aurora, 12.26.I.1971) at the MACN has a small hump on 5th interstria, but the 4th strongly costate in front of it; 7th not costate, without a hump, 9th costate but overhanging 10th only in part. It is remarkably large, with dorsum blackish. However, it might be an abnormal specimen of *H. ducalis*.

4- Male genitalia: paramera rather broad, acuminate or blunt; median lobe thick, subapical fenestra large. Size large. Shape elongate, depressed. Dorsum rather smooth; hump on 5th moderate to small. Pronotum squarish, flat; the usual median depression divided into a pair of small, usually triangular depressions. Femora melanic in known species. South America, as far south as the gallery forest of the Paraná. *H. metallipes*, *H. ducalis*.

Incertae sedis.

H. studiosorum sp. n.: head and pronotum granulated, unique in south-American fauna and possibly a plesiomorphic character, as it is found in other families of Hydrophiloidea (Helophoridae, Epimetopidae, Georissidae: see OLIVA, 1992b, Figs 7-8, 79-80, 95; also SMETANA, 1988). Male genitalia without remarkable characters.

H. multicostatus sp. n.: male genitalia remarkable by the shortness of all the pieces; this must be an autapomorphy. Elytral sculpture with several pairs of humps, possibly plesiomorphic (cf. OLIVA, 1992b: Figs 9, 81). It appears just possible that this species may have branched from the stock which produced the first complex, through a shortening of all the pieces of the male genitalia. In *H. obscurus* and some allied species, the convex portions of the interstriae often appear alutaceous.

H. drechseli MAKHAN, 1995: perhaps from a stock akin to the fourth complex (long narrow shape, thick median lobe), but it lacks the peculiar pronotal sculpture (and, less important, the melanic femora).

H. iduae MAKHAN, 1994. I have not seen the type. The male genitalia, as far as it can be made out from the poor drawing, is rather similar to that of *H. multicostatus* sp. n., but with median lobe acuminate, as long as the paramera. The basal piece appears to have an unnatural straight base; it may have been broken. The description states that the species has flat interstriae without humps. This species cannot be placed with present data.

Proper ordering of the genus can hardly be attained with the diagnostic characters now in use. It was remarked (OLIVA, 1992b) that the internal microtrichiae of the elytra differed in two species examined under Scanning Electron Microscope. This appears as a promising line; however, obtaining adequate material might be difficult. The large membranous fenestra in the median lobe of many species, and the ridge in *H. obscurus*, suggest some form of everting structure. This character ought to be studied, but the small size of the beetles, and the fact that most of the material available is dry, make manipulation difficult.

I do not name the species-complexes to avoid useless cluttering.

5. Acknowledgements

I thank: Dr E.J. FITTKAU (late from the ZSM) for communicating the Amazonian material, in which the strangest things are still appearing. Dr Georges COULON of the IRSNB, Dr Ben BRUGGE of the ZMA, Dr Ottó MERKL of the HNHM, Dr Manfred UHLIG of the MNB, Dr Stefan SCHÖDL of the NMW and Dr. Mario ELGUETA D. of the MNHNS for the prompt loan of types, which enabled me to complete this paper. Dr. H. BRUGE of Brussel for his tip on cleansing *Hydrochus* with commercial enzyme detergent. Lic. Cristina MARINONE, who dabbled in *Hydrochus* before turning to Cladocera, for bequeathing to me a thoroughly ordered collection, saving a lot of purely mechanical work. Last but not least, I thank Dr A.O. BACHMANN for his long (often unrewarded) work to put together a collection of aquatic insects of Argentina, which enabled me and other entomologists to make taxonomical studies; also for his reading of the long manuscript and for tips in translating from the German.

6. Literature cited

- ANGUS, R.B., 1977. - A re-evaluation of the taxonomy and distribution of some european species of *Hydrochus* LEACH (Col., Hydrophilidae). *Entomologist's mon. Mag.* 112 (1976): 177-201.
- BRUCH, C., 1915. - Nuevas especies de Coleópteros Hidrofilidos. *Revta Mus. La Plata*, 19 (2), serie 2 (6): 447-470.
- CHEVROLAT, A., 1863. - Coléoptères del l'île de Cuba (suite). Notes, synonymies et descriptions d'espèces nouvelles. Familles des Cicindélètes, Carabiques, Dytiscides, Gyrinides et Palpicornes. *Anns Soc. ent. Fr.* (4ème série), 3, 1863: 183-210.
- HELLMAN, J.L., 1975. - *A taxonomic revision of the genus Hydrochus of North America, Central America and West Indies*. Unpublished Ph.D. Thesis, University of Maryland.
- MAKHAN, D., 1992. - Twelve new *Hydrochus*-species from South America (Coleoptera: Hydrophilidae). *Phegea*, 20 (2): 95-103.
- MAKHAN, D., 1993. - Nine new *Hydrochus* species from South and Central America. *Anns Hist.-nat. Mus. natn. hung.*, 85: 65-70.
- MAKHAN, D., 1994. - Thirty-five new *Hydrochus* species from the Old and the New World (Coleoptera: Hydrophilidae). *Anns hist.-nat. Mus. natn. hung.*, 86: 29-42.
- MAKHAN, D., 1995a. - Descriptions of six new species of *Hydrochus* from South and North America (Coleoptera, Hydrochidae). *Zoological Studies* 34(2): 18-20 (1995).
- MAKHAN, D., 1995b. - Description of ten new species of *Hydrochus* from different parts of the world (Coleoptera: Hydrochidae). *Phegea* 23 (4): 187-193
- OLIVA, A., 1987. - El género *Hemiosus* en los Andes meridionales y la Patagonia (Coleopt., Hydrophilidae). *Revta Soc. ent. argent.* 44 (3-4): 377-381
- OLIVA, A., 1992a. - The species of *Hydrochus* (Coleoptera; Hydrochidae; Hydrophiloidea) described from South America. *Bull. Anns Soc. r. belge Ent.* 128: 87-104.
- OLIVA, A., 1992b. - Cuticular microstructure in some genera of Hydrophilidae (Coleoptera) and their phylogenetic significance. *Bull. Inst. r. Sci. nat. Belg., Ent.*, 62: 33-56.
- ORCHYMONT, A. D', 1939. - Notes sur quelques Palpicornia de la République Argentine. *Revta Soc. ent. argent.* 10 (2): 253-264.
- SHARP, D., 1882. - *Biologia Centrali-Americana (Coleoptera) 1 (2)*, London.
- SMETANA, A., 1988. - Review of the family Hydrophilidae of Canada and Alaska (Coleoptera). *Mem. ent. Soc. Can.* 142: 1-316.