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Distribution and Endemism in Hydrophiloidea (Coleoptera, Hydrophiloidea)

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ABSTRACT:
Continental drift caused the separation of lower taxonomic rank and they were then differentiated to higher taxonomic ranks by adaptive radiation. Besides this archaic and mostly passive transport active migration increasingly became a factor. New areas were colonized and others left. Islands formed and became submerged. Biogeography is a dynamic process which cannot be understood without knowledge of earth history.

In this paper the base of origin of Hydrophiloidea is discussed, and aspects of recent distribution and endemism of Hydrophiloidea are discussed.

KEY WORDS:
Coleoptera, Hydrophiloidea, zoogeography, distribution, endemism.

INTRODUCTION
"Pantha rhei" - all is flowing. Continuous motion and steady change are the principles of life. Zoogeography and distribution are not states but processes.

Nomenclature after Hansen 1999 and Short & Hebauer 2005.

1. GENERAL PART

1.1 The origin of Hydrophiloidea
After Crowson (1981) and Ponomarenko (1995) the origin of Staphyliniformia, including the Hydrophiloidea, arose at the transition between the Triassic and Jurassic eras, ca. 200 million years ago. At that time the ancient Gondwana was not yet divided into the continents that we now recognise. So some families, tribes and genera could have developed in all parts of the area. While the Gondwana-Laurasia continent drifted from one climate to another. It is supposed that insects migrated to favourable parts of the ancient continent. Then nearly 180 millions of years ago during the lower Jurassic the ancient continent fell to pieces, South America and Australia drifted away from Africa. At this time the tribes and genera of Hydrophilidae must have been already developed, because a later distribution over so large distances is improbable. Simultaneous evolution can be excluded. Some genera of the Hydrophilidae are present in more than one recent continent. The species of these genera however are generally not the same; they must have been developed later. Fossil insects confirm these assumptions. Records of the same species in different continents are in most cases explicable by distribution mechanisms, based on a palearctic-nearctic connection present for a long time, or in the afrotropical-neotropical connection existing until the Cretaceous.

A short chronology of the Continental Drift
(MCKENNA, M.C. 1980; POWELL, C. MCA., JOHNSON, B.D. and VEEVERS, J.J. 1981; WEGENER, A. 1929; RABINOWITZ P.D., CANDE, S.C. and LA BREQUE, J.L. 1976; TARLING, D.H. 1980):

200 million years ago:	Pangaea / Panthalassa
180-160 m.y.B.P.:	NAmerica+Greenland+Europe broke away from Pangaea (early Jurassic):
160 m.y.B.P.:	India and Madagascar separation from Africa (middle Jurassic). Separation of East Antarctica with Australia from Africa, South America and West Antarctica.
150 m.y.B.P.:	Separation of India from Antarctica.
127 m.y.B.P.:	Beginning of the active separation of South America from Africa.
92 m.y.B.P.:	Final land contact in the equatorial zone with uplifted land-bridge between Brazil and West Africa.
100 - 60 m.y.B.P.:	(Cretaceous - Tertiary): Separation of Australia from Antarctica.
55-45 m.y.B.P.:	India crossed the Equator. Northern Australia lay at 30°S.
1 m.y.B.P. (Pliocene):	A land bridge arose between North America and South America.

It is very difficult to find out the area of origin of a species, and so the starting-point of distribution because of the drift (mainly from south to north, from one climate to another) and rotation of an ancient continent. The direction of dispersion is rarely symmetrical because of several limitations and obstacles. A certain reference to the site of origin is the ecological preference of a species, best evaluated by its ecological requirements at the edges of its area of occupancy, which in most cases is specific there. Another reference to the area of origin (within a higher taxonomic rank) is the study of plesiomorphic characters of all known taxa of this subfamily, tribe or genus. Less useful is the recent distribution pattern, because it is already as the same value as a terminal phase of dispersal.

Trends of distributions are on the one hand the dynamic dispersion with progressive isolation, on the other hand a regressive reduction of the area with static isolation, comparable with an asymmetrical melting area of snow. The latter situation is best known from the boreo-alpine disjunct distribution of many water beetles caused by the Scandinavian glaciers (e.g. *Helophorus glacialis*).

The differentiation of higher taxonomic ranks between the west- and the eastsides of the Atlantic increasing from north to south is corresponds to the increasing distance between both coasts (ILLIES 1971). The circumboreal fauna of water beetles is still completely uniform, while the Palearctic fauna already has mostly different species of common genera (*Enochrus, Helophorus, Laccobius* etc.) except for introduced ones. This largely corresponds to the ancient Laurasian fauna. The Afrotropical and Neotropical faunas however, differ widely in the genera of common tribes and subfamilies (*Sternolophus-Tropisternus, Coelostoma-Phaenonotum*). The southern temperate climate, with the greatest distance between continents, differs in its Hydrophilidae fauna having families partly different from continent to continent, but in this part of the globe other factors influence the pattern because of the ancient unity of Antarctica (including the ancient Australia) with Africa and South America. Interesting observations, confirming this supposition, are the recent records of the genera Cylorgymus (known from South America) in the Cape Province of Africa (HEBAUER 2002), the proof of the genus Omicrus (Neotropical) in West Africa (BAMEUL 1993), the disjunct occurrence of the genus Notionotus in Central and South America as well as in the Orient (HEBAUER 2001) the recent discovery of the genus *Cyclotypus* (described from Central America) in Madagascar (HEBAUER 2002), also the distribution pattern of *Enochrus* (*Hydatotrephis*), *Limnoxenus* and others.

An extreme differentiation reaching back to subfamilies and even to related families is seen between the Palaearctic and Australian fauna (HANSEN 1990b), caused by the large distance of ancient continents through all times. Thus the Helophoridae are entirely separated from the Horelophinae (Hydrophilidae) of New Caledonia and from the Horelophopsinae (Hydrophilidae) of New Guinea (HANSEN 1997c). The Hydrochidae in contrast are amongst the most successful water beetles distributed almost all over the world. Helophoridae and Epimetopidae, though much more archaic than the latter, are of a restricted distribution confined to temperate regions. Relict taxa generally have a strong tendency to be confined to temperate regions (HANSEN (1997a).

The Spercheidae are a typical central-Gondwana family, most represented in the Afrotropical region (probably the area of their origin), but known also from South America in the west and the Oriental in the east, reaching even the North of the Australian continent. The latter two areas are possibly colonized on the route over the subcontinent India when a part of Africa. The only Palearctic species of this family, *S. emarginatus* is considered to be a late branch of evolution, judging from its large size adapted to cooler climate.

Looking at the map of late Mesozoic period it is not surprising that the archaic tribes Tormissini and Rygmodini, developed on the ancient Australia east of the Antarctis, have had little chance of reaching Gondwana. Most of the genera stayed isolated in the Australian region (Australia, New Zealand, and New Caledonia). A few genera have, however, reached South Africa (*Cylorgymus, Afrotormus*) and South America (*Cylorgymus, Pseudorygmodus, Andotypus*).

The Hydrophilidae are considered to be a monophyletic group, defined by some apomorphies (Hansen 1995b: 325). After Crowson (1981) the Hydrophiloidea, Histeroidea and Staphylinoidea may have arisen approximately 200 million years ago at the transition between the Triassic and Jurassic eras.

Ponomarenko (1995, 1987) recorded Hydrophiloidea from the lower Jurassic, Hydrophilidae s.str. from the upper Jurassic.

Georissidae and Hydrochidae are known from Eocene (Haupt 1956) and Oligocene (Scuder 1890). The phylogenetic position of Helophoridae is quite dubious. While Raup & Stanley (1978) and Bremer (1988, 1994) put the origin of Helophoridae at the base of the Hydrophiloidea arising in the lower Jurassic, Beutel (1994) put it to the upper Jurassic arising after Spercheidae and Hydrochidae, but still earlier than Epimetopidae, Georissidae and even Hydrophilidae. Fossils of Helophoridae are not known earlier than the late Tertiary (Matthews 1976).

There are still not known much fossil material to support the hypotheses of the real age of Hydrophiloidea families, but analysing their apomorphies the recent cladograms gives a rough age for the relevant families.

Minimum ages on direct fossil evidence are as follows:
Hydrophilidae: c. 150 million years ago,
Georissidae: c. 60 million years ago,
Hydrochidae: c. 40 million years ago,
Helophoridae: c. 5 million years ago (although based on the phylogenetic relationship (apomorphies) after Bremer (1988, 1994) the Helophoridae seem to be the most primitive familiy of Hydrophiloidea, while the Hydrophilidae s.str. with the most derived characters have to be the latest.

Spercheidae and Epimetopidae: Age dubious. (After Beutel 1994 the Spercheidae followed by the Hydrochidae are considered to be earlier than Helophoridae. These two families followed by Epimetopidae+Georissidae earlier than Hydrophilidae).

The place of origin of Hydrophiloidea (Staphyliniformia) must have been Gondwana. The recent distribution of Helophoridae (exclusively in the northern hemisphere) is somewhat intelligible.

The latest and most successful branches of Hydrophilidae are represented by the Sphaeridiinae, recently distributed all over the world.

1.2. Distribution

The natural cause of distribution is the continued reproduction of a species. Dispersal can be promoted by some factors, in particular by an increasing or even decreasing favourable climate, by overcoming a barrier, by protracting (ornithophoresis, wind transport, water transport etc.) or by finding a new route (in particular circumalpine distribution in Europe).
General conditions for unhindered expansion are

- No geographical barriers (mountains, large waters, glaciers),
- Tolerable ecological conditions throughout (climate, water chemistry, food, habitat),
- Tolerable competition.

The present distribution pattern of a genus or species is considered a snapshot of a very slow motion.

Over large geographical distances the distribution of a species or genus prefers the east-west direction because of the almost constant climate and vegetation along the same parallel of latitude (*Helophorus, Hydrobius*) (Figs. 3.20). This concept is confirmed also by a bipolar distribution, the striking isolated occurrence of a species in the north and south of the globe, in corresponding temperate and latitude comparable climates. So *Helophorus aethiops* occurs in the Palearctic north of Africa as well as in the temperate climate of South Africa (while the whole genus has a typically Holarctic distribution. I once identified a specimen of the west-mediterranean *Paracymus scutellaris* captured at the St. Helena Island west of the Cape of Good Hope. I have also seen the mediterranean *Cercyon arenarius* collected in South Africa etc.

GATTER (1981) proposed a system of migration for insects. He principally distinguishes active and passive migration, with return or without return, direction-orientated or not:

I. WIND TRANSPORT ("ANEMOMIGRATION - DRIFT")
Passive transport of flight-inclined insects by wind without direction-orientation.

II. EMIGRATION ("DISMIGRATION")
Endogenously (Dispersal) and exogenously (Spacing) released active "dismigrations" without or with only indirect direction-orientation (selection of favourable winds).
Expansive emigration: Active migration of non- or only indirect direction-orientated species that leave the area of origin.

III. MIGRATION
Migration of individuals or species programmed to endogenous migration and direction orientation or goal orientation.

IV. INVASION
Causes for invasion or evasion can be high population density, high rate of reproduction, food shortage etc.

Though this subdivision is adapted mainly to flyable land insects (many observations in migration are made on Lepidoptera, less on Coleoptera as Staphylinidae or Coccinellidae, very little on water beetles), it is also useful for water beetles because a lot of them (Dytiscidae, many Hydrophiloidea) are excellent fliers. A specimen the Dytiscid *Colymbetes fuscus* has been reported landing on a ship in the middle of the Atlantic.

The routes of migration are mostly the same as those known for migration of birds. These are historic or recent land connections, archipelagos and chains of isles, straits and coastal lines, large rivers etc. Land bridges generally arise by sinking sea level, caused by change of climate.

a) Archaic land connections:
- The **Thulean land bridge** between North America and Europe existing from Paleocene to Eocene, with large invasions of North-American species to West-Europe.
- The connection between England and the European Mainland, existing until the Litorina era in the Pleistocene, clears the almost identic fauna of Hydrophiloidea of both coasts, most obvious in such species which are confined to small areas (*Helophorus aequalis* - but not *aquaticus, Helochares punctatus* - but not *obscurus* etc.)
- The **Bering bridge** having existed at least temporarily during the Miocene and Pliocene eras (*Helophorus browni, sibiricus, orientalis*; after ANGUS 1973).
- The **Circumpacific mobile pelts** (cambrian-miocene) connecting the South American Anden (West- Patagonia) with New Zealand (over the West-Antarctic and Australian continents; Archinotis). After BRUNDIN (1966) there are to observe striking alliances between the New Zealand insects and the Neotropical (and in Patagonian) species, especially in the subfamilies of Chironomidae.
- **Antilles and Central America** have probably been connected in the Tertiary, proved by their common peculiar fauna.
- **The Panamanian land-bridge** connecting South America and North America arose rather late, after the Pliocene, about one million years ago.
- Between **New Caledonia, New Guinea and New Zealand** a temporary land-bridge is supposed in the Triassic (palaeo-endemic genera).
- The final land-contact between the **South American and African** continents, probably in the form of an upliftet land-bridge between Brazil and West Africa, occured in the Turonia (ca. 92 million years ago)." (SCHERER 1988 et al.).

b) Recent land connections:
- The **Tyrrhenis bridge** presumably once connecting Corso-Sardinia with Toscany in the Pleistocene.
  Though the greater part of the mediterranean Hydrophilidae fauna is present in Italy as well in Corsica and Sardinia, some endemics of Corsica (*Anacaena gaetanae* - but not *lutescens*; some Dyticidae) and different ones in Sardinia (*Helophorus subarcuatus* - but not *obscurus*) are not present in Italy.
- The **Sinai area**, connecting Africa with the Middle East, well known as an important bird passage, is also frequently used by insects as a gateway from Asia and Africa to Europe. The Levant fauna of Hydrophilidae (listed by HEBAUER 1997b) is a mix of afrotropical, european and oriental species.
- The **Galita bridges**, connecting Corso-Sardinia with Africa
- The **Baleares bridge** connecting once Corso-Sardinia-Balearics with Spain.
- The **Sicily-Africa bridge** temporarily existing in the Pleistocene. A great similarity in the Hydrophilidae fauna (not only concerning the common species of the Mediterranea) of Sicily and Tunisia is recognizable (*Enochrus falcarius, E. politus* etc.).

c) Archipelagos:
Groups of islands (volcanic origin, reef origin or raised by sinking sea level) are favourite possibilities for distribution of insects. Frequently they are the native countries for endemics.
Examples: The Canary Islands, the Cape Verde Islands, the Mascarene Islands, Melanesia, Hawaii etc. (see below under isle endemism).

d) Chains of isles:
As land bridges generally arise by sinking of the sea level, so chains of isles result from rising sea level after warming of the world climate, sometimes also (Hawaii) caused by volcanism (hot spot shifting).
Animals capable of flight are observed moving from isle to isle ("Island hopping" after ZIMMERMANN, in UDVARDY 1969).
The most important chain of isles is the Bering Strait, until the Pleistocene still perfectly connecting North America with Eurasia and enabling the exchange of animals. By the following raise of the sea level the strait becomes interrupted again.

e) Straits:
Gibraltar, Sicily, Bosphorus, East-Siberia-Japan strait, Bering strait - all these straits enable not only a direct migration of water beetles capable of flight but also a promising possibility for ornithophoresis, because straits are preferred migration routes for birds.

f) Coasts:
Coasts are also preferred migration routes for birds. Insects also use these routes for distribution. The best evaluated coastal routes are the West European coast, East-African coast, and the East-American coast - however these ways are mostly frequented by birds, by insects only over short distances because of their lesser flight capacity and the need to pass through areas with challenging climates.

Introduction is a passive type of distribution, increasing more and more in modern times. Tourism and world trade support this tendency. The most frequently introduced Hydrophilidae are belonging to the terrestrian genera (*Cercyon, Sphaeridium*) caused by transports of cattle. Thus the Palearctic *Cercyon quisquilius* reached the Australian continent. A number of introduced Hydrophilidae of Hawaii came from Europe and the Philippines. Large world ports such as Hamburg can list more than a dozen introduced beetle species a year from all over the world.

1.3. Endemism (Figs. 1. 2)

Endemism is the durable isolated occurence of a genus or species. Well known **causes** for endemism are:

a) Geographical isolation. Large distance caused by
- **Continental drift** (concerns the greater part of the Australian fauna, less striking the Neotropical and South African fauna).
- **Abduction** (men, ship, bird, wind, water, glaciers etc.). Numerous possibilities for abduction and introduction of insects to remote parts of the world, to isles especially by birds and modern tourism, can cause final isolation.
- **Migration**, during the existence of land bridges, or by active flight over acceptable distances, or via chains of isles.

b) Genetic isolation (result of evolution, after long time isolation and differentiation),
c) Ecological factors (change of climate or other life conditions causes rest areas).

Endemism is a relative term hard to define. It is to differentiate whether a species is considered to be endemic in a single locality, in a landscape, a country or a whole continent. The size of the area cannot be delimited. So the indicated numbers of endemics of an area are rather inexact, except, of course, for islands.

There are known endemic subfamilies (e.g. Horelophinae), tribes (e.g. Borborophorini), genera (e.g. *Andotypus*) and species (e.g. *Galapagodacnum darwini*). The occurrence of an endemic species is generally restricted to a smaller area than that of an endemic tribe, the species of which can be distributed over a whole continent such as Australia.

The countries of the southern hemisphere have many endemic taxa of higher taxonomic rank, while in the northern hemisphere there are no endemic genera at all.

There are several **types** of endemism:
a) Palaeo-endemicity: This is a decreasing form of colonization, a late phase of distribution, a rest population of a formerly much wider distribution. A palaeo-endemic inhabits still a part of the original area (comparable with melting snow). It is "autochthonous"
b) Neo-endemicity: This is an early phase of distribution, possibly inhibited by geographical (not ecological) barriers. A neo-endemic colonizes progressively new areas (comparable with growing mold).

1.3.1 The Isle endemism:

In general islands can come into being by isolation from a mainland or by arising out of the ocean (sinking sea level), also by volvanic eruption (Galapagos, Hawaii etc.) or reef rising. In the first case the fauna is the same as on the mainland for a long time and endemics develop step by step over races and increasing genetical isolation. In the latter cases colonization happens by introduction and migration of mainland species. The genetic isolation can follow after a long time; archaic forms and badly adapted mutants can become conserved longer than on the mainland; they become relicts. Especially wingless mutants of animals (insects, birds) have better chances to survive on islands than ones, capale of flight because they are less likely to be lost in storms.

Some representative examples are:

Buru (Indonesia, Moluccas): Oriental-Australian fauna. Origin: Continental (Sunda shelf).
The Moluccas are beyond the Wallace-line and their fauna might be expected to be predominantly Australian, but this rule seems to be less applicable to insects.
The species of Hydrophilidae of Buru known up to now are evenly mixed with Oriental species.
D´ORCHYMONT (1926b) indicates 11 species of Hydrophilidae, 2 of them endemic.

Species	Distribution
Enochrus nigropiceus ["rubrocinctus"]	Oriental
Sternolophus marginicollis ["tenebricosus"]	Australian, (Oriental)
Hydrophilus bilineatus ["picicornis"]	Oriental
Dactylosternum dytiscoides	Oriental, (Australian, Pacific, intr.)
Dactylosternum hydrophiloides	Oriental, (Australian)
Dactylosternum subquadratum	Australian, (Pacific)
Omicrogiton insularis	Oriental
Cercyon toxopeusi	**endemic**
Cercyon tropicus	**endemic**
Pelosoma orientale	Oriental
Sphaeridium seriatum	Oriental

Canary Islands: Palearctic fauna. Origin: partly volcanic (western islands), partly continental (eastern islands).
Total: 27 spp. of Hydrophilidae (after MACHADO & OROMI).
Endemic: 4 spp. (= 15%): *Anacaena haemorrhoa, conglobata, marchantiae, Laccobius atrocephalus canariensis*.

Distribution at the three isle groups (after D´ORCHYMONT, 1940a, b):

	Canaries	Madeira	Azores
Helophorus longitarsis	+	-	-
Coelostoma hispanicum	+	-	-
Dactylosternum abdominale	+	+	+
Sphaeridium bipustulatum	-	+	+
Cercyon littoralis	+	+	+
Cercyon nigriceps	+	+	+
Cercyon quisquilius	+	+	-
Cercyon terminatus	-	+	-
Cercyon inquinatus	+	+	+
Cercyon obsoletus	+	-	+
Anacaena haemorrhoa	+	-	-
Anacaena conglobata	-	+	-
Anacaena marchantiae	-	+	-
Laccobius atricolor	-	+	-
Laccobius atroceph.canariensis	+	-	-
Laccobius praecipuus	+	-	-
Enochrus bicolor	+	-	-
Enochrus politus	+	+	-
Helochares lividus	-	-	+
Chaetarthria similis	+	-	-
Oosternum costatum	-	-	+

Cape Verde Isles: Afrotropical fauna. Origin: volcanic.
Total 25 spp. of Hydrophilidae (after D´ORCHYMONT 1940a, b):
Endemic: 1 sp. (*Cercyon fimicola*)

Coelostoma rutarum
Coelostoma rufitarse
Dactylosternum abdominale
Cercyon fimicola
Cercyon putricola
Cryptopleurum suturatum
Cryptopleurum sulcatum
Paracymus phalacroides
Laccobius minor
Laccobius gracilis
Laccobius subpictus
Laccobius revelierei
Helochares dilutus
Enochrus hesperidum
Enochrus wollastoni
Sternolophus solieri
Berosus nigriceps
Regimbartia nilotica

Caroline Islands (Polynesia): Origin: Volcanic.
D´ORCHYMONT (1937) mentions only one hydrophilid (*Dactylosternum superficiale*).

Hawaii Isles: Predominantly introduced fauna. Origin: volcanic.
Total 21 spp. of Hydrophilidae (after HANSEN, 1995a; listed there).
Endemic: 2 spp. (*Limnoxenus semicylindricus, L. nesiticus*).
Indigenous: 1 (+3?) (*Omicrus brevipes*),
Introduced: from Europe, Philippines.
Adventive: from North America, East Pacific, West Africa, cosmopolitan.

ZIMMERMANN (1948) recorded ca. 5000 spp. of insects of ca. 100 families in Hawaii (all introduced, of oriental, australian, american origin; some of them have hardly changed, others have split off to produce numerous endemic species and genera).

St. Helena: Afrotropical fauna. Origin: volcanic.
The Hydrophilidae fauna is little known.
Dactylosternum abdominale
Paracymus scutellaris (vidi); introduced.

Malgasy Subcontinent: Madagascar separates from Africa in the Middle Jurassic (ca. 160 millions years ago).
The origin of the fauna is diverse and has a high degree of peculiarity in spite of vicinity to the African continent. The subcontinent is considered to be a part of Africa. Several genera and species of Hydrophiloidea have arrived in the archipelagos from far areas.
The islands of the Malgasy region (Madagascar, Comores, Seychelles, Réunion, Rodrigue, Mauritius are of different origin and have rather different faunas of Hydrophiloidea with different endemics.

Mostly Afrotropical fauna. Origin: Gondwana.

	Total	endemic		Afrotropical		Oriental	
	n	n	%	n	%	n	%
Hydrophilidae	151	58	38.4	53	35	4	9.2
Georissidae	14	12	86	2	14	-	-
Spercheidae	3	1	33	2	67	-	-
Hydrochidae	5	5	100	-	-	-	-

An updated check list is given at the end of this paper.

a) Madagascar: The fauna of Hydrophiloidea is very rich and diverse, with numerous endemics (as known also in the vertebrates).

	Total	endemic		Afrotropical		Oriental	
	n	n	%	n	%	n	%
Hydrophilidae	121	58	48	46	38	5	0.4
Georissidae	14	12	86	2	14	-	-
Spercheidae	3	1	33	2	67	-	-
Hydrochidae	5	5	100	-	-	-	-

b) La Réunion: Afrotropical-Oriental fauna. Origin: volcanic; ca. 2.2 millions years ago.
Hydrophilidae:
Total: 16, endemic: 3 (= 19%) (*Enochrus mauritiensis reunionensis* Balf.-Br., *Berosus vinsoni* BALF.-BR., *Omicrogiton gomyi* BAMEUL, *Cercyon luteopictus* BALFOUR-BROWNE).
Spercheidae:
Total: 1 (*Spercheus senegalensis* CAST.)

c) Mauritius: Afrotropical-Oriental fauna. Origin: volcanic; ca. 8 millions years ago.
Hydrophilidae:
Total: 28, endemic: 7 (= 25%) Genus *Tritonus*! [*cribratus* (Muls.)], *Enochrus curtus* Balf.-Br., *E. mauritiensis* (Rég.), *Dactylosternum vinsoni* Balf.-Br., *Cercyon crenatostriatus* Rég., *C. nigerrimus* Rég., *Psalitrus vinsoni* Balf.-Br.)
Spercheidae:
Total: 1 (Sp. *senegalensis* Cast.)

d) Rodriquez: Afrotropical-cosmopolitan fauna. Origin: volcanic; ca. 1.5 millions years ago.
Hydrophilidae:
Total: 6, endemic: 0

e) Seychelles: Afrotropical-cosmopolitan fauna. Origin: Continental (40 isles).
Hydrophilidae:
Total: 24, endemic: 7 (= 29%) (*Paracymus alluaudianus* Scott, *Helochares sechellensis* Rég., *Bourdonnaisia mahensis* Scott, *B. silhouettae* Scott, *Paromicrus atomus* Scott, *P. carinatus* Scott, *P. thomasseti* Scott).

f) Comores: Afrotropical fauna; sparse known. Origin: volcanic.
Hydrophilidae: Total: 2, endemic: 0
The Hydrophilidae of roughly 75 islands (reef origin) are still unknown.

The colonisation of the isles is supposed to be happened by drift-wood and plants from adjacent coasts (Madagascar), by wind and tropic cyclones, by oceanic currents, also by human caused introduction. (FAIRMAIRE 1893).

Melanesia: Mostly endemic fauna. Origin: Archaic. (Collision of continental plains, and drift).
This archipelago roughly comprises
New Britain
New Caledonia
New Guinea
New Ireland
Solomon Islands
Vanuatu-New Hebrides
Fiji

Recent papers on this area are GENTILI (1980), HEBAUER (2001).

a) New Britain: Little is known on the Hydrophilidae fauna of this island. GENTILI (1980) mentiones *Laccobius novaebritanniae* G. (endemic), *L. roseiceps* Rég. (Oriental); HANSEN (1999) described *Platycyon subopacus* and *P. superficialis* from there.
Further known from New Britain are *Pelosoma eremita* Knisch, *Ceryon afflatus* Knisch and *Cercyon cognatus* Knisch.

b) New Caledonia: Australian fauna. Origin: Archaic.
D´ORCHYMONT (1937) lists 1 Spercheidae (*S. platycephalus*) and 18 Hydrophilidae (inclusively 9 endemics, = 50%) from New Caledonia. Some further species are to be added.

Total: 22 spp.

Endemic:	9 spp.	(= 41%)
Oriental:	1 sp.	(= 4.5%)
Australian:	10 spp.	(= 45.5%)
Cosmopolitan:	2 spp.	(= 9%)

Actual species list:

Species	Endemic	Oriental	Australian	Pacific
Berosus distigma	+	-	-	-
Berosus albipes	+	-	-	-
Berosus australiae	-	-	+	-
Paracymus metallescens	+	-	-	-
Paracymus pygmaeus	-	-	+	+
Paranacaena violacea	+	-	-	-
Laccobius elevatus	+	-	-	-
Laccobius maculatus	+	-	-	-
Helochares foveicollis	-	-	+	-
Helochares tatei	-	-	+	-
Chasmogenus nitescens	-	-	+	-
Enochrus maculiceps	-	-	+	-
Enochrus elongatulus	-	-	+	-
Enochrus esuriens	-	+	(+)	?
Sternolophus marginicollis	-	(+)	+	-
Hydrophilus australis	+	-	-	?
Hydrophilus brevispina	-	-	+	-
Coelostoma fabricii	-	(+)	+	+
Dactylosternum abdominale	-	(+)	(+)	cos.
Dactylosternum auripes	+	-	-	-
Dactylosternum helleri	+	-	-	-
Cercyon inquinatus	-	(+)	(+)	cos.

c) New Guinea (Part of the Sahul shelf): HEBAUER (2001a) reviewed the Hydrophilidae fauna of Papua-New Guinea, listing 158 species (at present already 171 species known, including 79 % endemics). A preceding paper trades the genus Platycyon in this area (HEBAUER 2000b). GENTILI (2002) reviewed the genus Paranacaena, listing additional 13 species from Papua-New Guinea. Two other papers on the genus Pilocnema are (HANSEN 2003; HEBAUER 2004) listing 9 + 5 species respectively.
The majority of the present known species is endemic; a few species are of Oriental and Australian distribution.

Hydrophilidae:
(including the species of Irian Jaya, Papua, New Britain, and New Ireland).

Distribution	species	%
Endemic	124	78.5
Oriental	29	18.3
Australian	9	7.2
(Cosmopolitan	2	1.2)
Pacific	3	1.8

Spercheidae: 2 species (*Spercheus platycephalus* MACLEAY and *S. wattsi* HEBAUER).
Hydrochidae: 4 species (*Hydrochus chitaniei* MAKHAN, *H. gitaraiae* MAKHAN, *H. imamkhani* MAKHAN, *H. japonicus* SHARP).
Georissidae: 2 species (*Georissus biroi* DELÈVE, *G. neoguineensis* DELÈVE).

d) New Ireland: Almost nothing is known on the Hydrophilidae fauna of this isle. HANSEN (1999) indicates *Platycyon superficiale* HANSEN from there (and from New Britain). Indicated also is *Pelosoma eremita* KNISCH. From New Britain are known: *Platycyon subopacus* HANSEN, *Laccobius novaebritanniae* GENTILI, *Cercyon afflatus* KNISCH, *C. cognatus* KNISCH.

e) Solomon Isles: Only three *Laccobius* are mentioned by GENTILI (1980): *Laccobius solomonicus* GENTILI (endemic), *L. tenebricosus* GENTILI (endemic), *L. roseiceps* RÉG. (Oriental), *Pelosoma eremita* KNISCH (Australian).

f) Vanuatu (Hebrides-Banks Islands: BALFOUR-BROWNE (1939) indicates from the "New Hebrides and Banks Islands"
Total: 11 Hydrophilidae
Endemic: 2

Species	Distribution:
Helochares pallens	Oriental
Enochrus artensis	Australian
Enochrus esuriens	Oriental
Enochrus cheesmanae	**endemic**
Sternolophus marginicollis	Australian
Hydrophilus australis	Australian
Coelostoma fabricii	Oriental
Dactylosternum dytiscoides	Oriental
Dactylosternum subquadratum	Australian
Omicrogiton cheesmanae	**endemic**
Pelosoma eremita	Australian

g) Fiji (inluding Vatu Leile), Samoa, Tonga (Easternmost isle group of Melanesia, consisting of 300 larger and 540 very small isles): [BUXTON 1935; D´ORCHYMONT 1937].
Introduced Australian fauna. - Origin: Collision of Indo-Australian plain with Southwest-Pacific basin.
From Samoa D´ORCHYMONT (1927, 1937) mentions 6 species of Hydrophilidae: *Dactylosternum abdominale* (FABR.), *D. subquadratum* FAIRM. [Australian], *Noteropagus politus* D´ORCH. [Oriental], "*Enochrus parvulus*" [?*E. natalensis* (G. & H.), ?*Agraphydrus minutissimus* (KUW.); Afrotropical], *Enochrus tritus* BROUN [Australian], *E.* "*bryani*" D´ORCH. {= *maculiceps* MCLEAY; Australian].
From the Fiji Ils. are recorded *Dactylosternum subquadratum* FAIRM. [Oriental], *D. leveri* BALFOUR-BROWNE, *Coelofletium coelostomoides* D´ORCHYMONT [Australian].

New Zealand Endemic fauna. Origin: archaic (60-80 mill. years ago broken away from Australia).
Total: 45 spp. of Hydrophilidae (after HANSEN 1997b).
20 (= 10 spp.) Hydrophilinae,
80% (= 40 spp. Sphaeridiinae),
Endemic: 41 spp. (= 91%)

HYDROPHILINAE:
Endemic: Subfamily Horelophinae (1 sp.)
Genus *Cylomissus* (1 sp.)

SPHAERIDIINAE:
Archaic tribes (dominant):
Rygmodini: *Cylorgymus, Pseudorygmodus, Rygmodus, Saphydrus*.
Tormissini: *Exydrus, Hydrostygnus, Tormissus, Tormus.*

Derived tribes (almost absent)
Coelostomatini: *Adolous, Cyloma* (endemic);
Omicrini, Megasternini *(Cercyodes laevigatus* BROUN),
Sphaeridiini.

D´ORCHYMONT (1937) lists 60 Hydrophilidae species; a large part of them is synonymized or transferred to other genera by HANSEN (1997b). Only a few species are introduced or not endemic (*Cercyon analis* (PAYKULL), *Paracymus pygmaeus* (MCLEAY), *Limnoxenus zealandicus* BROUN, *Enochrus tritus* BROUN).

Philippines (Consisting of 7000 isles): Oriental fauna.
Origin: Pacific (Collision of three continental plates).
Two early papers listing the Hydrophilidae of the Philippines are known (D´ORCHYMONT, 1925; 1926a). Many recent records complete the faunal list step by step, but there is still a lot of undescribed species (especially *Cercyon*) in several museums.

Total: Spercheidae:	1 sp.	(*Spercheus stangli* SCHWARZ & BARBER).
Hydrochidae:	1 sp.	(*Hydrochus harrydeepaki* MAKHAN, ?*Hydrochus japonicus* SHARP).
Hydrophilidae:	80	spp.
Endemic:	33	spp. (= 41)
Oriental:	47	spp. (= 59 %)
Palearctic:	7	spp. (= 9 %)
Australian:	15	spp. (= 19%).
Cosmopolitan:	2	spp. (= 0.3%)

A few species occur also in the Afrotropical region (*Coelostoma stultum*, *Dactylosternum hydrophiloides*, *D. pygmaeum, Omicrogiton insularis, Noteropagus occlusus, Cercyon lineolatus*).

(A complete ckecklist is given at the end of this paper).

Sri Lanka: India and Madagascar (as well as Antarctica/Australia) separates from West Gondwanaland in the Middle Jurassic (ca. 160 mill. years ago). Then India separates from Antarctica (ca. 150 millions years ago) crossing the Equator and collided with Eurasia in the Tertiary pushing up the Himalayas. After the isolation of Sri Lanka several endemics could arise there.

ILLIES (1971) supposed that the original Gondwanan population of ancient India became extinct during the collision with the Eurasian continent and was later recolonized from the Palearctic. However, the recent checklist of Hydrophilidae of India and Sri Lanka indicates an overwhelming Oriental colonization, in addition to many endemics. Palearctic species of Hydrophiloidea are recorded only in the southern Himalaya; Afrotropical species are quite absent.

A previous checklist of the Hydrophilidae, based on an expedition of the Lund University (1962) is given by HEBAUER (2000a). The actual numbers are as follows:

Hydrophilidae:	n	%
Total spp.:	82	100
Spp. described from Sri Lanka	57	70
Oriental	59	72
Endemic	24	29
Cosmopolitan	2	2.4

Georissidae: 1 sp. (*Georissus gemma*).
Hydrochidae: 1 sp. (*Hydrochus lacustris*)
Spercheidae: 2 spp. (*Spercheus hanseni, S. stangli*).
Epimetopidae: 1 sp. (*Eumetopus flavidulus*).

Taiwan: Oriental fauna, influenced by Palearctic elements, with many endemics. Origin: Continental.
D´ORCHYMONT (1913, 1914) evaluated the large outputs of H. Sauter´s expedition to "Formosa". More recent outputs (L.-J.Wang, Natural History Museum Vienna etc.) resulted in the recognition of further new species, including some endemics (HEBAUER & WANG 1998, HEBAUER 2000c). At present there are known:

Hydrophiloidea:
Total: 70 spp.
Endemic: 10 spp. (= 14%), (*Hydrocassis taiwana* SATÔ, *Crenitis formosana* HEBAUER, *Pelthydrus jengi* SCHÖNMANN, *Hydrocassis taiwana* SATÔ, *Laccobius politus* GENTILI, *Laccobius flaveolus* HEBAUER, *Oocyclus magnificus* HEBAUER, *Megagraphydrus politus* HANSEN, *M. wangi* HEBAUER, *Enochrus sauteri* D´ORCH., *E. parumstriatus* HEBAUER, *Psalitrus sauteri* D´ORCH.).
Oriental: 56 spp. (= 80%)
Palearctic: 37 spp. (= 53%)
Cosmopolitan: 2 spp. (= 3%)
Some of these species are also distributed over other zoogeographical regions. An updated check list is given at the end of this paper.

1.3.2 The continental endemism

In the ancient continents of the southern hemisphere which drifted earliest and furtherst away there developed isolated taxa of high rank (subfamilies, tribes, genera) which had no chance to colonize the next continent. The following evolution affected numerous taxa of lower rank, which now are mostly distributed over the whole continent or subcontinent. The best examples are in Australia and New Zealand.

This type of continental endemism (palaeo-endemicity) differs from the island endemism (neo-endemicity) principally in the fact that the continental endemics are mostly insensitive (eurioceous) and well adapted. In most cases they have a considerable competition. Badly adapted species in contrast have rarely a chance for survival there, in contrast to the island endemics.

In general continental endemics are members of endemic tribes.

1.3.3 The central endemism

This type of endemism can be considered to be a remnant population or to be a population of species extremely adapted to special conditions or to the coincidence of some ecological factors.

Why should a species not expand since there is no visible obstacle? We should not forget that there exist also invisible limits, especially concerning water insects which frequently are dependent on the water chemistry and the food dependent of the latter.

Generally water beetles have a wide range of temperature tolerance, they are adapted to seasonal drying up of their habitat in the diapause, but their larvae are highly sensitive against changes of the water chemism (acidity, oxygen, ions etc.). A species can disappear from an area without a recognizable cause, but also remaining limited to a small part of an area as an endemic.

Numerous observations in the past have solved some puzzle concerning the ecology of water beetles, accelerated mainly by the increasing nitrogen concentration in lakes and ponds with the effect of the loss of acid waters and fens. The water beetles adapted to acid water disappear rapidly in central Europe (*Berosus luridus* (L.), *Crenitis punctatostriata* LETZNER, *Enochrus affinis* (THUNBERG), *coarctatus* (GREDLER), *ochropterus* (MARSHAM), etc.).

Each animal needs a number of life conditions or factors, a certain range of temperature, of light, of humidity, of oxygen, of water salinity and acidity, of water current, of food, etc.
At every locality there is on offer a set of defined conditions. Only one absent or insufficient factor can make the existence of a species intolerable or impossible. All necessary factors together must form an ecological window, which can be wide or narrow. The animal itself can tolerate a wide or narrow range of life conditions, and then it is called "*euryocious*" or "*stenocious*" (HEBAUER 1994a).

3.4 Extremity endemism

Extremity endemism is a zoogeographical peculiarity to obeserve around the edges of landscapes or continents where a significant accumulation of endemics seem to wait for a ship. A similar tendency is known on mountains, where the desired route to higher altitudes ceases. Every accumulation of endemics in an area gives rise to a special situation.

The causes for this behaviour seem to be an adaptation of some animals to a colder or warmer climate, which can not be attained because of a barrier. This barrier can be an ocean, a high mountain ridge or even a mountain that is too low. So the species expected in this area are diluted and the percentage of endemics growe. Known areas with striking extremity endemism are the Cape of Good Hope in South Africa, also the Primorskij Kraj in Far East Russia. (The endemic Hydrophilidae fauna of the former area is listed in HEBAUER, 1999, 2007, that of the latter area is listed in HEBAUER, 1995a, 2007, and SHATROVSKIY, 1989.

Extremity endemism can be explained by genetic causes as one possibility, but what about genera such as *Crenitis* with endemic species in South Africa? This genus contains generally cold-adapted species of sources and running waters. Recent investigations in Namibia resulted that this southern part of Africa in a former period was covered with a largeice cap. This was long time before South Africa in the Jurassic (105-130 mill. years ago) reached 55°S, still contacting the southern part of South America and the Antarctica. In this era the evolution of the hydrophilid genera was already complete. The genus *Crenitis* possibly has reached the main areas of its recent distribution on India, eastern Oriental maybe also Australia over this route by means of the north-drifting ancient India. In this view the recent occurrence of the *Crenitis* populations near the Cape of Good Hope are considered to be relicts and the Southern Gondwana is possibly the site of origin of that genus.

2. Special part

For clarifying the mechanisms and routes of dispersal, migration and distribution, the successful genera represented in almost all over the geographic regions of the world (*Hydrochus, Berosus, Cercyon, Dactylosternum* etc.), are of less interest than the more sporadic and largely disjunct genera. In some cases the progress in evolution is clearly seen in the disjunct distribution of different subgenera (*Georissus, Helophorus*) or in the less differentiated genera (of Epimetopidae etc.). A widely disjunct distribution of a species is mostly caused by introduction, while a widely disjunct distribution of a genus sometimes indicates an archaic land connection.

The new climate or changed ecological factors after introduction or migration possibly plays a decisive part in the origin of subgenera.

The recent distribution is the result of a dynamic migration process. Sometimes it is caused by contraction of an area.

HELOPHORIDAE

Genus: *Helophorus* FABRICIUS, 1775	total:	186	spp.
Subgenus: *Orphelophorus* (D´ORCHYMONT, 1927)		2	spp.
Transithelophorus ANGUS, 1970		3	spp.
Empleurus HOPE, 1838		7	spp.
Kyphohelophorus KUWERT, 1886		1	sp.
Eutrichelophorus SHARP, 1915		2	spp.
Trichohelophorus KUWERT, 1886		2	spp.
Gephelophorus SHARP, 1915		2	spp.
Thaumhelophorus ANGUS, 1995		1	sp.
Helophorus FABRICIUS, 1775		16	spp.
Lihelophorus ZAITZEV, 1908		2	spp.
Rhopalhelophorus KUWERT, 1886		148	spp.

(Comprehensive references: ANGUS, R.B. 1970 b, c, 1986, 1988 b, 1992, 1995).

DISTRIBUTION: The Helophoridae including only the genus *Helophorus* are a predominantly Holarctic family, exceeding the Palearctic southwards barely in northern India (*angusi* HEBAUER, *frater* D´ORCHYMONT, *inexpectatus* ANGUS, *mervensis* SEMENOV, *montanus* D´ORCHYMONT, *tuberculatus* GYLLENHAL), and Egypt (*aethiopicus* RÉGIMBART, *mervensis* SEMENOV), exceeding the Nearctic to Neotropical barely until Mexico (*linearis* LECONTE, *regularis* SHARP, *robertsi* SMETANA). A disjunct distribution of a single species (*aethiops* BALFOUR-BROWNE) is observed in South Africa.

Tentatively, the site of origin of Helophoridae, characterised by several plesiomorphic characters, is central Asia, up to now producing a number of primitive subgenera. An early colonization of the Holarctic with subsequent differentiation and radiative adaptation is assumed. So at present many species with diverse ecological preferences are distributed in the Holarctic. Though the greater part of the genus inhabits freshwater, there are also adaptations to brakkish water (*alternans* GENÉ), acid water (*flavipes* FABRICIUS, *laticollis* THOMSON, *pumilio* ERICHSON, burnt peat, not truly aquatic (*tuberculatus* GYLLENHAL) or even to terrstrial habitats (*nubilus* FABRICIUS, *porculus* BEDEL, *schmidti* VILLA & VILLA etc.) (Figs. 3, 4).

Originally *Helophorus* is a cold adapted to moderate adapted genus (*Rhopalhelophorus* + *schmidti* on snowmelt!). Warm adaptation (*aethiops* BALFOUR-BROWNE, *asturiensis* KUWERT, *longitarsis* WOLLASTON etc.) is considered to be a late apomorphic character.

EPIMETOPIDAE	total:	29	spp.
Genera: *Eumetopus* BALFOUR-BROWNE, 1949		8	spp.
Eupotemus JI & JÄCH, 1998		2	spp.
Epimetopus LACORDAIRE, 1854		19	spp.

(Comprehensive reference: JÄCK, M. & EASTON, E.R.1998).

DISTRIBUTION: This small family has an exclusively tropical distribution. The three genera are separate in their distribution, occurring in the Neotropical (*Epimetopus*), Afrotropical (*Eupotemus*) and Oriental (*Eumetopus*) regions. Probably their origin was in the ancient continent of Gondwana from where the ancestor could have arrived South America anterior to the division of the continent. The colonization of the Oriental region could have been effected by the northward moving Madagascar.

The recent species seem to be generally aquatic and exhibit some morphological peculiarities. One of the apomorphic features is that the female carries the egg sacc (as known also from the genera *Spercheus* and *Helochares*) (Fig. 5).

GEORISSIDAE

Genus: *Georissus* LATREILLE, 1809	total:	77	spp.
Subgenera: *Neogeorissus* SATÔ, 1972		66	spp.
Nipponogeorissus SATÔ, 1972		2	spp.
Georissus LATREILLE, 1809		9	spp.

(Comprehensive references: DELEVE, J. 1967, 1972; SATÔ, M. 1972; HEBAUER, F. 2004b).

DISTRIBUTION: This family including barely one genus with three subgenera has a worldwide distribution and it is characterized by several autapomorphies. The distribution of the sub-

genera is partly overlapping, partly disjunct. While *Georissus* s.str. prefers the moderate climates in the Holarctic, with an isolated population in the almost moderate central part of South America (2 species), the subgenus *Neogeorissus* inhabits the whole Afrotropical, Oriental and Australian regions, reaching to north until central Europe. The smallest area extending from Japan to Papua-New Guinea is occupied by the subgenus *Nipponogeorissus*, overlapped by both other subgenera. So the distribution of the family as a whole extends from the south border of Canada and the line Baltic Sea - Japan in the North, and as far as Patagonia, the Cape of Good Hope and Tasmania in the South. The dispersal of the genus might have begun in the Triassic from Africa independently in three directions - to South America, still connected with Gondwana, to Eurasia by direct migration, and to the Oriental via Madagascar - before differentiating into subgenera.

All species of the family are more or less warmth-adapted. They have never colonized the extreme North. The centre of the recent distribution is Africa, presenting 33 species (= 43%). The adults are not distinctly aquatic. They commonly live in wet soil at the edges of water, covering themselves with a layer of soil particles (Fig. 6).

HYDROCHIDAE

Genus: *Hydrochus* LEACH, 1817 total: 177 spp.

(Comprehensive references: MAKHAN, D. 1993 etc.; OLIVA, A. 1996).

DISTRIBUTION: Hydrochidae, the sister group of Georissidae, are like these worldwide in distribution and include only one genus. Adults and larvae are aquatic and inhabit various kinds of freshwater according to their special adaptations.
The site of origin of the family is quite dubious. Probably it was situated in the southern continent of Gondwana, as based on the number of species in the Neotropical, Afrotropical and Australian fauna (Fig. 7).

SPERCHEIDAE

Genus: *Spercheus* KUGELANN, 1798 total: 18 spp.

(Comprehensive reference: HEBAUER, F. 1997 b).

DISTRIBUTION: Spercheidae is a predominantly Afrotropical family, though represented in all major biogeographic regions except the Nearctic. The family includes only one genus with at present 17 described species, inhabiting stagnant freshwater.

The geographical centre of the genus *Spercheus* is the tropical Africa and Madagascar. It might have been arised there. Two species (*S. fimbriicollis* BRUCH, *S. halophilus* ARCHANGELSKY) are known from South America; two species from Northern Australia. The only definite Palearctic species is *S. emarginatus* (SCHALLER), while *S. cerisyi* GUÉRIN MÉNEVILLE and *S. belli* CHAMPION are considered to have crossed the border to the Palearctic.
Spercheus emarginatus SCHALLER is the largest species of the family. It seems to be the most derived member of Spercheidae. Evolution starts always from the small bodied animals, whilst those with large bodies are generally culs-de-sac of evolution. The smallest member of Spercheidae (*Spercheus cerisyi* GUÉRIN MÉNEVILLE) proves this rule with its subspecies and varieties.

The whole family seems to be warmth-adapted. Peculiarities in behaviour (sometimes informative for the origin and distribution) are (as also in Epimetopidae) that the female carries the eggs in a sac. A unique behaviour in Hydrophiloidea is the manner of feeding by filtering under the surface of the water (Fig. 8).

HYDROPHILIDAE

Subfamily: Horelophinae total: 1 sp.

Genus: *Horelophus* D´ORCHYMONT, 1913 1 sp. AU

DISTRIBUTION: Considering the absence of many derived characters in the adult of *Horelophus*, especially the long subapical seta on the outer face of the labial palpi, this subfamily must have been arised in the Triassic much earlier than the Hydrophilinae. Probably it represents a palaeo-endemic subfamily, monotypic and at present only known from New Zealand. *Horelophus walkeri* D´ORCHYMONT seems to be hygropetric (Fig. 9).

Subfamily: **Horelophopsinae** total: 2 sp.

Genus: *Horelophopsis* HANSEN, 1997 2 sp. AU, PA

DISTRIBUTION: This monotypic subfamily of Hydrophilidae is, as its sister group Horelophinae, a presumably palaeo-endemic taxon with relict distribution, although not restricted to Irian Jaya (Papua N.G.) but also recorded from the Ryukyu Islands (Fig. 9).
Little is known about the life history and ecology.

Subfamily: **Hydrophilinae**

Tribus: **Sperchopsini** total: 23 spp.

The first Hydrophilinae tribe Sperchopsini represents (like the Horelophinae and Horelophopsinae) a small and widely isolated ancient group of forms distributed in the temperate to subtropic climates of Neotropical, Nearctic, Palearctic and Australian Regions. Only a small number of species is described until now. All members of this group are characterised mainly by two apomorphic features: elytral margins finely serrate or denticulate, pronotum with double-sized punctation.
The species are aquatic, at the edges of running water (Fig. 9).

Genus: *Hydrocassis* FAIRMAIRE, 1878 15 spp.

DISTRIBUTION: The distribution centre of *Hydrocassis*, the sister group of *Ametor*, is almost the same as that of the compared genus (China) but much more constricted than the latter, slightly exceeding the Palearctic to Oriental. So the distribution pattern in combination with the morphological features leads us to suppose that the eastern Palearctic was the site of origin of both genera (Fig.9).
As *Ametor* all species of *Hydrocassis* live at the edges of more-or-less rapidly flowing streams.

Ametor SEMENOV, 1900 5 spp.
(Comprehensive reference: SCHÖDL, S. & Ji, L. 1995).

DISTRIBUTION: Though the distribution centre of Ametor is the same as that of Hydrocassis, its area extends from China over eastern Siberia and the Bering Street until western Canada and California. Two species attained the Oriental (Bhutan, northern India). All known species live at the edges of running water (Fig. 9).

Sperchopsis LECONTE, 1861 1 sp.

DISTRIBUTION: The only species of the genus known up to now (*S. tesselata* (ZIEGLER)) is recorded from the East Coast of Canada and U.S.A. It is doubtful whether this is the site of its origin, but possibly indicate an unrecognized dispersal route for dispersal (Fig. 9).

Anticura SPANGLER, 1979 1 sp.

DISTRIBUTION: As in Cylomissus the only known species of the genus (*C. glabratus* BROUN) is strongly isolated from other Sperchopsini, known only from southern Argentina and adjacent Chile. Presumably it is a palaeo-endemic form.

Cylomissus BROUN, 1903 1 sp.

DISTRIBUTION: The isolated distribution of this monotypic genus, constricted to New Zealand indicates a palaeo-endemic genus. Formerly the genus was placed in the tribe Rygmodini, and then transferred to Sperchopsini. Little is known about the habitat of *C. glabratus* BROUN (Fig. 9).

Tribus: **Berosini** total: 351 spp.

Berosini are a cosmopolitan, though predominantly tropical group of Hydrophilidae, favoured by some apomorphies: They are excellent swimmers and good fliers; they inhabit a variety of aquatic habitats (freshwater as well as brackish water). Within the Berosini the genus *Berosus* is represented in all major biogeographical regions. All other genera of the tribe are strongly restricted to warmer climates. In spite of the wide morphological spectrum of the genera the tribe is considered to be a monophylum (HANSEN 1995). This fact and also the distribution extending to the Australian region favoured the theory of a common origin presumably on the ancient continent of Gondwana.

Genus: *Hemiosus* SHARP, 1852 32 spp. NT
DISTRIBUTION: An exclusively Neotropical genus with richly varied species population, spread on whole South- and Central-America.
As in all other Berosini the species of *Hemiosus* are aquatic and known to be excellent swimmers.

Berosus LEACH, 1817
Subg.: *Enoplurus* HOPE, 1838 103 spp. AF,AU,NA,NT,OR,PA

Berosus LEACH, 1817 161 spp. AF,AU,NA,NT,OR,PA
(Comprehensive references: SCHÖDL, S. 1991, 1992, 1993, 1994 a, b, 1995 a, c).

Phelerosus SHARP, 1884 1 sp. AU
DISTRIBUTION: This genus is one of the most successful groups of Hydrophilidae with worldwide distribution, though predominantly Neotropical.
The species inhabit several types of stagnant water; some species prefer brakish water.

Derallus SHARP, 1882 18 spp. NT
DISTRIBUTION: This genus (transitional between the *Berosus-Hemiosus*-group and the *Regimbartia-Allocotocerus*-group) is (as Hemiosus) an exclusively Neotropical one, but extending north as far as southern Nearctic.
The species mainly inhabit stagnant freshwater.

Regimbartia, ZAITZEV, 1908 10 spp. AF,AU,OR,PA
DISTRIBUTION: The genus is spread on Afrotropical and Oriental. Barely one species (attenuata) has arrived Australia and the Palearctic region.
The species are aquatic; they inhabit various types of freshwater.

Allocotocerus KRAATZ, 1883 26 spp. AF,AU,OR
DISTRIBUTION: The distribution pattern of this genus is almost the same as that of *Regimbartia* except for Palearctic.
The species are frequently associated with Regimbartia species.

Tribus: **Chaetarthriini** total: 88 spp.
This tribe represents a clearly monophyletic group of 5 genera, characterized by a fringe of long setae at the anterior margin of first ventrite. The species are cosmopolitan, but predeominantly tropical (Figs. 10, 11).

Genus: *Hemisphaera* PANDELLÉ, 1876 5 spp. AF, PA
DISTRIBUTION: The geographical centres are two widely disjuncted areas, one Palearctic (Greece, Italy, Spain), and the other Afrotropical (Tanzania, Madagascar) (Fig. 10).
The species seem to prefer the subtropical climate and inhabit there stagnant shallow water.

Chaetarthria STEPHENS, 1835 48 spp. AF,AU,NA,NT,OR,PA
(Comprehensive reference: HEBAUER, 1993, 1995).
DISTRIBUTION: The genus *Chaetarthria* is represented in all major biogeographic regions, except for Australian. In southern Africa however it is replaced by *Thysanarthria*. In spite of its preference for warmer climate it is spread in the Palearctic north as far as Lapland (Fig. 10).
The species inhabit shallow stagnant water among decaying vegetation or banks; a few are terrestrial.

Thysanarthria D´ORCHYMONT, 1926 10 spp. AF,OR
(Comprehensive reference: HEBAUER, 2001).
DISTRIBUTION: This genus is spread within delimited area extending from Africa over the Arabian Peninsula, Afghanistan and India as far as Vietnam (Fig. 10).
All species inhabit small and shallow warm water and wet banks.

Guyanobius SPANGLER, 1986 2 spp. NT
DISTRIBUTION: As an endemic genus of north-eastern South America the two known species of *Guynobius* link the genera *Chaetarthria* and *Amphiops*, both fitted with the typical fringe of long hairs rising from the first ventrite, as seen in *Chaetarthria*, but with the body shape of an *Amphiops*, with deeply emarginate eyes (incomplete *canthus*).

Amphiops ERICHSON, 1843 20 spp. AF,AU,OR,PA
(Comprehensive reference: HEBAUER, 1998).
DISTRIBUTION: The distribution pattern of *Amphiops* is almost the same as in *Chaetarthria* but a little more extended in the east to Japan and northern Australia (Fig. 11). The Far East species (*A. mater*) tend to split off to several subspecies.
The species are aquatic and occur among vegetation or debris at the edges of water; they are excellent swimmers.

Apurebuium GARCÍA, 2002 1 sp. NT
DISTRIBUTION: Both genera *Apurebium* and *Venezuelobium* represent sympatric endemics of the mountainous part of western Venezuela (Fig 10).
After GARCÍA (2002) all known species of both genera prefer swamps and wet river banks, as do most associated *Chaetarthria*.

Venezuelobium GARCÍA, 2002 2 sp. NT
DISTRIBUTION: See Apurebium (Fig.10).

Tribus: **Anacaenini** total: 238 spp.
Although a monophyly of the Anacaenini is supposed, the generic delimitation remains uncertain. Nevertheless there are observed close groups of genera, such as *Anacaena-Paranacaena-Paracymus*, or *Crenitis-Notohydrus-Enigmata-Phelea*, while other genera stand more isolated (*Grodum*). Only a phylogenetic analysis can solve the problem. The site of their origin is hardly to evaluate, but the distribution of some genera as far as Australia, Tasmania and South America (besides Africa) indicates the ancient continent of Gondwana as in many other tribes and genera.
Considering the small size of all species a passive dispersal far away (e.g. by ornithophoresis) is possible.

Genus: *Enigmata* HANSEN, 1999 2 sp. AF
DISTRIBUTION: The two species of this late genus are endemics of Madagascar (Fig. 12).

Notohydrus BALFOUR-BROWNE, 1939 5 spp. AU
(Comprehensive reference: GENTILI, E. 1992).
DISTRIBUTION: This genus is confined to a single region, and there it is only recorded from the south-east of Australia. It differs from all other genera of Anacaenini in the long and stout maxillary palpi. After GENTILI (1996) it might be considered linked to the other genera through the cosmopolitan Paracymus (Fig.12).

Paracymus THOMSON, 1867 81 spp.
(Comprehensive references: GENTILI, E. 2000; WOOLRIDGE, D. P. 1966, 1976, 1977a, b).
DISTRIBUTION: *Paracymus* is represented in all major biogeographic regions.
The species occur in stagnant waters, some of them are halobiontic.

Crenitis BEDEL, 1881
Subg.: *Crenitis* BEDEL, 1881 35 spp. AF,AU,OR,PA,NA,NT
Acrenitis Matsui & Nakane, 1985 7 spp. PA,OR
(Comprehensive reference: HEBAUER, F. 1994).
DISTRIBUTION: The genus is present in all major biogeographic regions, although predominantly in the warmer climates. It consists of two well delimited subgenera. The subgenus *Acrenitis* is however confined to Far East Asia und Japan.
Crenitis is a predominantly hygropetric genus. The species inhabit sources mountainous creeks, but also acid water and sphagneta.

Phelea HANSEN, 1999 1 sp. AU
DISTRIBUTION: The only known species, a single female (*P. breviceps*) is considered to be a palaeo-endemic of Tasmania (Fig. 12).
Nothing is known about the habitat of this species.

Grodum HANSEN, 1999 2 spp. AF
DISTRIBUTION: The area of the present known species of this genus is restricted to the South- and East-coast of South Africa. *G. endroedyi* is only recorded from the Cape Province (Fig. 12). Both species are observed to occur on terrestrial habitats with decaying forest litter.

Anacaena THOMSON, 1851 57 spp AF,NA,NT,OR,PA.
(Comprehensive references: D´ORCHYMONT, A. 1942; KOMAREK, A. 2004, 2005).
DISTRIBUTION: The genus *Anacaena* is represented in all major biogeographical regions except Australia, where it is replaced by *Paranacaena*. The geographical centres are three, Afrotropical, Oriental, and Neotropical. Only a few species are distributed in the Palearctic and Nearctic.
The species inhabit stagnant, rarely slowly running, water.

Paranacaena BLACKBURN, 1888 36 spp. AU
(Comprehensive references: GENTILI, E. 1993, 1996 b, 2002).
DISTRIBUTION: Besides *Anacaena, Paranacaena* is the genus with the most richly varied Anacaenini population. Although restricted to the Australian the genus is focussed in Papua New Guinea.
The habitat of most species corresponds to that of *Anacaena* species.

Notionotus SPANGLER, 1972 13 spp. NT,OR
(Comprehensive reference: HEBAUER, F. 2001b).
DISTRIBUTION: The geographical centres of this genus are two, one Neotropical (Central America and Venezuela), the other Oriental (India, Nepal, South-east Asia). This disjunct distribution pattern characterizes the genus as a palaeo-endemic one, and suggests its origin in the ancient continent of Gondwana, although the absence of the genus in recent Africa undermines this suggestion (Fig. 12).
The species are hygropetric, comparable with most *Crenitis*.

Hebauerina GENTILI, 2002 1 sp. OR
DISTRIBUTION: Only one species of this late genus is known up to now from Thailand (Fig. 12).
Nothing is known about the habitat of this species.

Tribus: **Laccobiini** total: 311 spp.
The tribe has a worldwide distribution; it is considered to be a monophylum (Hansen 1995). The wide spectrum of species and subspecies can present useful indicators on site of origin of the ancestor. *Gentili* (1983) considered *Hydroxenus* to be the very ancient subgenus of *Laccobius*, representing the basis of evolution of the genus, arising prior to the division of the ancient continent Gondwana. Thus Gondwana has to be the site of origin of the genus *Laccobius* and thus the origin of Laccobiini might be stated at least in the Trias nearly 230 millions years ago.

Genus: *Pseudopelthydrus* JIA, 1998 1 sp. OR (China)
Pelthydrus D´ORCHYMONT, 1919 OR,PA
Subg.: *Globipelthydrus* SCHÖNMANN, 1994 22 spp.
Pelthydrus s.str. 33 spp.
(Comprehensive references: SCHÖNEMANN, C. J. 1994, 1995).
DISTRIBUTION: Both the subgenera of *Pelthydrus* are spread through the whole Oriental Region (including South China); only two species have reached Japan by way of the Ryukyu's. Within the tribe Laccobiini *Pelthydrus* holds an exceptional phylogenetic position, caused by some apomorphies.
All species inhabit running water (streams and rivers), frequently with rotting leaves at the bottom.
Distribution maps are given by SCHÖNEMANN (1994, 1995).

Hydrophilomima HANSEN & SCHÖDL, 1997 3 spp. OR
DISTRIBUTION: The genus is closely allied with *Pelthydrus*; it seems to be endemic in the area Vietnam-Yunnan. The species inhabit debris in running water, from sea level up to 1100 m above sea level.

Arabhydrus HEBAUER, 1997 1 sp. AF
DISTRIBUTION: This very peculiar monospecific genus is an endemic of southern Arabia (Oman), where it was collected from several wadis.

Gentilina HEBAUER, 2002 1 sp. AU
DISTRIBUTION: A monospecific genus, endemic to Australia (Queensland).
The large type series has been collected from a small waterfilled rockhole in front of a waterfall, enriched with some plant debris.

Laccobius ERICHSON, 1837
Subg.: *Glyptolaccobius* GENTILI, 1989 9 spp. OR
Cyclolaccobius GENTILI, 1991 27 spp. AF,OR,PA
Yateberosus SATÔ, 1966 1 sp. AU (New Cal.)
Notoberosus BLACKBURN, 1895 34 spp. AU,OR
Hydroxenus WOLLASTON, 1887 19 spp. AF,NA,OR
Dimorpholaccobius ZAITZEV, 1938 35 spp. AF,NT,PA
Compsolaccobius GANGLBAUER, 1904 2 spp. PA
Laccobius ERICHSON, 1837 25 spp. NT,OR,PA
Microlaccobius GENTILI, 1974 63 spp. AF,AU,NT,PA
subg.? 13 spp. AU,OR
(Comprehensive references: GENTILI, E. & CHIESA, A. 1976; GENTILI, E. 1983, 2003, 2005).
DISTRIBUTION: The largest genus of Laccobiini is spread on all biogeographical regions, except Neotropical. At least 9 subspecies have evolved; most of them are not only structurally but also geographically characterized. This might be a result of the genetical isolation since they have arised on the ancient continent of Gondwana. The subspecies *Hydroxenus* might have been the ancestor of the whole genus; it had split off in serveral branches. A hypothetical dendrogram is given by GENTILI (l. c.).
The detailed distribution of the subgenera is shown in the figs. 13-17.
The species inhabit different aquatic habitats. Most prefer stagnant water but some (*L. alternus* MOTSCHULSKY) inhabit rivers, others (*L. thermalis* MÜLLER) being adapted to thermal springs.

Tritonus MULSANT, 1846 1 sp. AF
DISTRIBUTION: This monospecific genus is an endemic of the island of Mauritius.
After BAMEUL (1986) *Tritonus* have hygropetric ecology.

Scoliopsis D´ORCHYMONT, 1919 1 sp. OR
DISTRIBUTION: This remarkable genus and its species are somewhat comparable with *Beralitra* and *Tritonus*; it seems to belong to the very ancient Gondwana forms. Like most palaeo-endemic genera its range is confined to a narrowly limited area (Sri Lanka).
Nothing is known about the habitat.

Beralitra D´ORCHYMONT, 1919 2 spp. NT
DISTRIBUTION: An endemic Neotropical genus, which is recorded from Argentina and Bolivia between 10°-30°S.
Nothing is known about the habitat.

Oocyclus SHARP, 1882 17 spp. NT,OR
(Comprehensive references: HEBAUER, F. & WANG, L.-J. 1998; SHORT & PERKINS 2004; SHORT & SWANSON 2005).
DISTRIBUTION: The two geographical centres of this genus are Oriental, and Neotropical. The route of distribution is dubious because it is absent from Africa.
The beetles prefer hygropetric habitats.

Ophthalmocyclus KOMAREK, 2003 1 sp. OR
DITRIBUTION: This recently described monospecific genus is an endemic of South India; it is considered to be a sister group of *Oocyclus*.
The ecology of *Ophthamocyclus* seems to be the same as of *Oocyclus*, because the holotype was collected under moss covering a wall, in a film of running water.

Tribus: **Hydrophilini**
It is not surprising that the largest tribe of the family has a cosmopolitan distribution with high diversity concerning habitus, distribution pattern and ecology of genera and species. Nevertheless HANSEN (1995) considered this tribe to be monophyletic. Some genera are represented in all major biogeographic regions, other genera are only found in the northern hemisphere (*Hydrobius, Cymbiodyta, Helocombus*), but most genera of this tribe are confined to the southern hemiphere. Between the latter groups several endemics are observed.

Subtribus: Acidocerina: total: 509 spp.

Genus: *Quadriops* HANSEN, 1999 6 spp. NT

DISTRIBUTION: The distribution of this recently discribed genus seems to be confined to Central America and northern South America. It differs from all other Hydrophilini, except *Omniops*, by the divided eyes (as known from *Amphiops*) (Fig. 19).
Probably the species are terrestrial inhabitants of rainforest litter. Some of the species are collected at light.

Omniops PERKINS & SHORT, 2004 2 sp. NT

DISTRIBUTION: This newly described genus seems to be endemic to Papua New Guinea. It is closely related to the Neotropical Quadriops, with which it shares the divided eyes, and from which it clearly differs in a row of long setae on the labrum (unique in Acidocerina). The extensive similarity in morphology of both palaeo-endemic genera suggests a common origin on the ancient continent of Gondwana (Fig 19).
In contrast to *Quadriops, Omniops* seems to be aquatic, because of the presence of an extended ventral hydrofuge pubescence.

Guaramacalus GARCÍA, 2000 2 spp. NT

DISTRIBUTION: This newly described genus, based on two species (at first glance similar to *Paracymus*), seems to be endemic in the mountain waters of the Neotropical Andes.
The types are collected in a river-valley of the fog-wood, between 700-1.900 m above sea level.

Troglochares SPANGLER, 1981 1 sp. NT

DISTRIBUTION: This endemic genus of Ecuador consits of a single blind species which was once collected from a cave on calcite formations (Fig. 18).
The long maxillary palpi put the genus close to *Helochares* or even *Chasmogenus*.

Agraphydrus RÉGIMBART, 1903
Subg.: *Agraphydrus* RÉG. 1903 14 spp. AF,AU,PA,OR
Gymnhelochares D´ORCH. 1932 4 spp.

DISTRIBUTION: This is one of the largest genera of Acidocerina. Although at present merely 18 species are described, further 151 species are recognized to be new and already designated. The species are represented in almost all warmer climates, except the Neotropical. This suggests the genus is rather derivative, possibly arisen posterior to the division of the ancient continent of Gondwana. The route of distribution might have run from eastern Africa via southern Arabia to India and South-east Asia and hence to Australia.
Most of the species inhabit small brooks in primary forests, at least in the Oriental; all are excellent fliers. Though the genus is widely distributed, almost each species is strongly confined to a mall area. Most of the species are endemics. This is associated with the prevalence and size of the microhabitats that they occupy.

Megagraphydrus HANSEN, 1999 10 spp. OR
(Comprehensive reference: HEBAUER, F. 2000c).

DISTRIBUTION: This Oriental sister group of *Agraphydrus* has, in contrast to the latter, a rather restricted distribution, extending from Sri Lanka over South-east Asia, West-Malaysia and southern China (Anhui Province) to Taiwan.
The species colonizes similar habitats to those of *Agraphydrus*.

Acidocerus KLUG, 1855 1 sp. AF

DISTRIBUTION: Only one species of this peculiar genus of Acidocerina is known. *A. aphodioides* KLUG is an endemic of Mozambique (Fig. 18).
Nothing is known about the habitat of this genus.

Helochares MULSANT, 1844 .
Subg.: *Sindolus* SHARP, 1882 8 spp. NT
Helochares s.str 37 spp. AF,AU,NT,OR,PA
Helocharimorphus KUWERT, 1890 3 spp. AF
Hydrobaticus MACLEAY, 1871 122 spp. AF,AU,NA,NT,OR
Batochares HANSEN, 1991 3 spp. AF
(Comprehensive reference: HEBAUER, F. 1996).

DISTRIBUTION: Apart from *Enochrus* this is the largest genus of Acidocerina. The subgenera *Helochares* and *Hydrobaticus* are represented in almost all major biogeographic regions. The

absence of the subgenus *Helochares* in the Nearctic however is inconvenient, as well as the lack of the subgenus *Hydrobaticus* in the Palearctic shows. The remaining subgenera have a tighter, predominantly Afrotropical, distribution. Only *Sindolus* is Neotropical. Most species of the genus, especially of the rather primitive subgenus *Hydrobaticus* are spread over recent Africa. So the site of origin of *Helochares* might be the ancient continent of Gondwana.

Peltochares RÉGIMBART, 1907 1 sp. AF
DISTRIBUTION: Certainly the most conspicuous genus of Acidocerina is represented by the endemic *Peltochares conspicuus* RÉGIMBART, which seem to be very primitive. It is recorded only from West-Africa (Gabon, Cameroon, DR Congo), and it is presumably a Gondwana relict (Fig. 19).
The ecology is apparently aquatic.

Helopeltarium D´ORCHYMONT, 1943 1 sp. OR
DISTRIBUTION: This inconspicuous and evidently derivative member of Acidocerina, represented by a single species (*H. ferrugineum* D´ORCHYMONT) appears to be an endemic of Myanmar (Fig.19).
Nothing is known about the habitat of this species.

Helobata BERGROTH, 1888 9 spp. NT
DISTRIBUTION: This genus seems to be the sister group of *Peltochares*. *Helobata* is spread over almost the whole Neotropical (which in the Jurassic had been separated from Africa), opposite the African area, in which *Peltochares* occur (Fig. 19).
The habitat is aquatic. Most species are collected from flooded and swampy river banks (after GARCÍA, 2000).

Dieroxenus SPANGLER, 1979 1 sp. NT
DISTRIBUTION: The sole species of the genus (*D. cremnobates* SPANGLER) is an endemic of Ecuador (Fig. 19).
The ecology is hygropetric.

Chasmogenus SHARP, 1882 36 spp. AF,AU,NT,OR,PA
(Comprehensive reference: HEBAUER, F. 1992).
DISTRIBUTION: This genus with a richly varied species population is spread on almost the whole southern hemisphere, attaining the Mediterranean. This distribution pattern suggests, that it must have been already arisen from the ancient continent of Gondwana prior to its division in the lower Jurassic (Fig.18)
The species inhabit stagnant water with decaying plants; they are observed to be excellent fliers, frequently taken at light.

Enochrella HANSEN, 1999 3 spp. OR
DISTRIBUTION: The distribution of this small genus (which is poorly separated from *Enochrus*) seems to be limited to the Philippines (Fig.19).
Nothing is known about the habitat of the species.

Enochrus THOMSON, 1859
Subg.: *Hydatotrephis* MACLEAY, 1971 4 spp. AF,AU,OR
(Comprehensive references: HANSEN, 1990a, HEBAUER, 1998b).
Methydrus REY, 1885 137 spp. AF,AU,NA,NT,OR,PA,PC
(Comprehensive references: HEBAUER, F. 1998b, 2001d, 2002c, 2003).
Holcophilydrus KNIZ, 1911 8 spp. AF,PA
Lumetus ZAITZEV, 1908 38 spp. AF?,AU,NA,NT,OR,PA
(Comprehensive reference: HEBAUER, F., 2004a).
Enochrus s.str. 10 spp. AF,AU,NA,OR,PA
(Comprehensive reference: HEBAUER, F., 1998b).
Hugoscottia, KNISCH, 1922 17 spp. NT
(Comprehensive reference: MOUCHAMPS, R. 1956).

DISTRIBUTION: The most extensive genus of Acidocerina, consisting of 5 subgenera; it is as expected, spread over all geographic regions. Only the subgenera *Holcophilydrus* (possibly the most primitive one) and the subgenus *Hugoscottia* are confined to more isolated areas.

The former is a more Palearctic subgenus, though represented also in the Malgasy area, the latter is spread on the whole Nearctic. A third subgenus, *Hydatotrephis*, presumably arisen from the ancient continent of Gondwana prior to the division of the continent (confirmed by the recent distribution in the southern parts of South America, Africa, and Australia).
Most species inhabit shallow stagnant water with algae. Some *Enochrus* prefer brackish water (*halophilus, hamifer, bicolor* etc.), others acid water (*affinis, coarctatus, fuscipennis* etc.)

Cymbiodyta BEDEL, 1881 29 spp. NA,NT,PA
(Comprehensive reference: SMETANA, A. 1974).
DISTRIBUTION: A predominantly Nearctic genus with one species recorded in western Palearctic as far as the Caspian Lake and Aral Lake (*C. marginellus* (FABRICIUS). The origin of this genus seems to be the ancient continent of Laurasia (Fig.18).
Most species inhabit stagnant freshwater, among vegetation; some species prefer acid water of fens and bogs.

Helocombus HORN, 1890 1 sp. NA
DISTRIBUTION: This genus has a rather tight distribution, confined to the eastern Nearctic (Canada and western U.S.A). It might have been arisen from the ancient continent of Laurasia (Fig. 18).
The unique species was collected from woodland ponds.

Subtribus: Globulosina total: 1 sp.
Genus: *Globulosis* GARCÍA, 2001 1 sp. NT
DISTRIBUTION: A newly erected subtribe with a unique species, which seems to be an endemic of Venezuela.
The habitat of the type specimen is simply described as a "natural pool".

Subtribus: Hydrobiusina total: 17 spp.
DISTRIBUTION: Except for the genus *Hydrobius*, all genera of the subtribe are represented in the warmer regions; all are present in Australian, all are endemics between 20°S and 40°S.

Genus: *Hybogralius* D´ORCHYMONT, 1942 1 sp. AU
DISTRIBUTION: Only a single species (*H. hartmeyeri* (RÉGIMBART)) is known of this genus. The species is an endemic of Southwest Australia (Fig. 22).
The type specimen was collected "in a small stream".

Hydrobius LEACH, 1815 8 spp. NE,PA
DISTRIBUTION: The only genus of Hydrobiusina which is spread over the whole Palearctic and Nearctic, although some species of the genus have a tighter distribution. Probably the genus has arisen on the ancient continent of Laurasia (Fig. 20).
The species live in almost all types of stagnant freshwater between decaying vegetation.

Limnoxenus MOTSCHULSKY, 1853 6 spp. AU,PA,PC
DISTRIBUTION: The geographical centres of this genus are quite disjunct. Each genus is confined to a single area: *L. niger* TSCHACH, western Palearctic, *L. olmoi* HERNANDO & FRESNEDA, Spain and Portugal, *L. sjostedti* KNISCH, South Africa, *L. zealandicus* BROUN, Australia and New Zealand, *L. nesiticus* (SHARP) and *L. semicylindricus* (ESCHSCHOLTZ), Hawaiian Is. (Fig. 21). The origin of this genus is rather dubious, but all species prefer warm to moderate climate; so it is supposed that the genus having arisen from the ancient continent Gondwana prior to its division in the lower Jurassic. The two endemic Hawaiian species however are possibly derivative from *L. zealandicus*.
All species inhabit stagnant freshwater with decaying vegetation.

Limnocyclus BALFOUR-BROWNE, 1939 1 sp. AU
DISTRIBUTION: This monospecific genus is an endemic of New Caledonia. The weakly convex and elongate body with the outline slightly interrupted between pronotum and elytra, as well as the 10 punctate striae of elytra indicate that *L. puncticeps* BALFOUR-BROWNE is a rather ancestral form of the subtribe (Fig. 22).
Nothing is known about the habitat.

Hydramara KNISCH, 1925 1 sp. AU
DISTRIBUTION: An endemic monospecific genus of North Argentina (Fig. 22).
The habitat is "in mountain streams".

Subtribus: **Hydrophilina** total : 196 spp.

The subtribe representing mainly large and very large species consists of 5 genera, which are distributed almost all over the world. The subtribe is probably monophyletic.

Genus: *Sternolophus* SOLIER, 1834
Subg.: *Neosternolophus* ZAITZEV, 1909 5 spp. AF,AU,OR,PA
Sternolophus s.str. 4 spp. AF,OR.PA

DISTRIBUTION: The absence of the genus in the Nearctic north of U.S.A., similarly in the Palearctic north of the line from Morocco to Japan (Fig. 23) characterizes the species as predominantly thermophilous. While the subgenus *Neosternolophus* is represented from Africa as far as Australia and Melanesia, the subgenus *Sternolophus* s.str. is absent in Australia.
The species inhabit almost all types of stagnant freshwater with rich vegetation and debris.

Hydrochara BERTHOLD, 1827? 23 spp. AF,NA,PA
(Comprehensive references: SMETANA, A. 1980, 1983).

DISTRIBUTION: The geographical centres of this genus are three, one Nearctic (excluding Canada and Alaska), the second Palearctic (excluding the high north), the third Afrotropical (excluding the north) (Fig. 24).
Similar to *Sternolophus*, the *Hydrochara* species inhabit almost all types of stagnant freshwater with rich vegetation.

Hydrobiomorpha BLACKBURN, 1888
Subg.: *Brownephilus* MOUCHAMPS, 1959 1 sp. PA
Hydrobiomorpha s.str. 53 spp. AF,AU,NA,NT,OR
(Comprehensive references: BACHMANN, A. O. 1988; MOUCHAMPS, R. 1959a).

DISTRIBUTION: A large genus spread over all warmer regions. Only one species, representing a separate subgenus, occurs as an endemic in the southern Palearctic (Israel).
The ecological preferences are as in *Hydrochara*.

Tropisternus SOLIER, 1834
Subg.: *Pleurhomus* SHARP, 1883 1 sp. NT
Homostethus D´ORCHYMONT, 1921 3 spp. NT
Pristoternus D´ORCHYMONT, 1936 29 spp. NT
Tropisternus s. str. 26 spp. NT,NA
Streptitornus HANSEN, 1989 3 spp. NT,NA
(Comprehensive references: D´ORCHYMONT, A. 1921, 1922).

DISTRIBUTION: This large genus, close to *Sternolophus* and *Hydrophilus*, is exclusive to the American continent, except for the extreme north of Nearctic and the southernmost part of the Neotropic (Fig. 23).
The species inhabit different types of shallow freshwater with decaying vegetation, some subgenera also prefer slowly flowing water.

Hydrophilus GEOFFROY, 1762
Subg.: *Dibolocelus* BOHEMAN, 1891 9 spp. NT,NA
Hydrophilus s. str. 37 spp. AF, AU,NT,OR,PA
Temnopterus SOLIER, 1834 2 spp. AF
(Comprehensive reference: RÉGIMBART, M. 1901).

DISTRIBUTION: This genus (divided in at present 3 subgenera) with the largest species is spread on all geographic regions (except Pacific), but most of the species are restricted to warmer climates; only 4 species occure in Europe, 7 species also in the restly Palearctic, 3 species in the Nearctic, all other species belong to the Neotropical, Oriental or Australian fauna.
The beetles are adapted to large stagnant water bodies with Phragmites vegetation.

Subfamily: **SPHAERIDIINAE**

HANSEN (1991) has proved the monophyly of Sphaeridiinae and modified the arrangement of tribes within the subfamily. This is important for interpretation of some recent distribution patterns of the genera, evaluation the routes of distribution, and predicting the origin of the genera.
As Sphaeridiinae represent the most derived group of Hydrophilidae, the phylogenetic connections and ranks are the more uncleared, the ways of distribution are frequently no more to

trace because of the influence of introduction by man, cattle transports, birds, wind, water etc. favoured by their smallness and by their largely terrestrial ecology. Most species of Sphaeridiinae live in dung or decaying vegetation (*Cercyon, Sphaeridium* etc.).

Tribus: **Rygmodini** total: 21 spp.
DISTRIBUTION: The isolated distribution of primitive genera as of Rygmodini in southern parts of Africa, South America or (and) Australia points to palaeo-endemism, so more as the genus occurs in more than one of the indicated regions. Thus all genera of Rygmodini might be paleo-endemic (Fig. 25).

Genus: *Cylorgymus* d´Orchymont, 1933 2 spp. AF,NT
DISTRIBUTION: The recent record of a second species of *Cylorgymus* in the Cape Province of Africa was not at all surprising because it was known from the southern Neotropical. The possible record of this or another new species of the genus in Australia would only complete the typical distribution pattern of an ancient Gondwana genus (Fig. 25).
Nothing is known about the habitat.

The fact that several of the primitive genera of Hydrophiloidea are frequently distributed in more than one southernmost areas of Neotropical, Afrotropical and Australian (partly even Oriental) but in all known cases never represented there by the same species, may prove these genera had already arisen in the ancient continent of Gondwana, while the recent species must have evolved posterior to the division of Gondwana. Such genera are *Cylorgymus*, *Cyclotypus, Limnoxenus, Notionotus,* and *Spercheus* etc.

Pseudorygmodus Hansen, 1999 1 sp. NT
DISTRIBUTION: Palaeo-endemic of southernmost Neotropical (Chile) (Fig. 25).
Nothing is known about the habitat.

Saphydrus Sharp, 1884 3 spp. AU
DISTRIBUTION: Palaeo-endemic of New Zealand (Fig. 25).
Nothing is known about the habitat.

Eurygmus Hansen, 1990 1 sp. AU
DISTRIBUTION: Palaeo-endemic of northern Australia (Queensland) (Fig. 25).
Nothing is known about the habitat.

Pseudohydrobius Blackburn 1898 2 spp. AU
DISTRIBUTION: Palaeo-endemic of eastern Australia (Fig. 25).
Nothing is known about the habitat.

Rygmostralia d´Orchymont, 1933 1 sp. AU
DISTRIBUTION: Palaeo-emdemic of southern Australia (New South Wales) (Fig. 25).
Nothing is known about the habitat.

Rygmodus White, 1846 11 spp. AU
DISTRIBUTION: Palaeo-endemic of New Zealand (Fig. 25).
Nothing is known about the habitat.

Tribus: **Tormissini** total: 9 spp.
Except for the genus *Afrotormus*, all other genera of this primitive group of Sphaeridiinae are confined to New Zealand. The phylogenetic vicinity to Rygmodini, Andotypini and Borborophorini as well as the distribution pattern put the tribe to the ancent Gondwana forms (Fig. 26).
After scant informations all species are terrestrial and live in diverse kinds of decaying organic matter.

Genus: *Tormus* Sharp, 1884 3 spp. AU
DISTRIBUTION: Paleo-endemic of New Zealand (Raurimu) (Fig. 26).
Nothing is known about the habitat.

Afrotormus Hansen, 1999 2 spp. AF
DISTRIBUTION: Paleo-endemic of South Africa (Cape Province) (Fig. 26).
Nothing is known about the habitat.

Exydrus Broun, 1886 1 sp. AU
DISTRIBUTION: Paleo-endemic of New Zealand (Tairua) (Fig. 26).
Nothing is known about the habitat.

Hydrostygnus SHARP, 1884 1 sp. AU
DISTRIBUTION: Paleo-endemic of New Zealand (Whangarai, Tairua)(Fig. 26).
Nothing is known about the habitat.

Tormissus BROUN, 1893 2 spp. AU
DISTRIBUTION: Paleo-endemic of New Zealand (Bounty Is., Mokohinou, Wellington, Greymouth) (Fig. 26).
Nothing is known about the habitat.

Tribus: **Andotypini** total: 4 spp.
Only two widely isolated genera represent this tribe. The distribution pattern proves again the site of origin at ancient Gondwana, although recently not recorded from South Africa (Fig. 26). All species are terrestrial and live in decaying organic matter (dung, leaf, litter etc.).

Genus: *Andotypus* SPANGLER, 1879 2 sp. NT
DISTRIBUTION:
Palaeo-endemic of Neotropical (Chile, Osorno Province) (Fig. 26).
Nothing is known about the habitat.

Coelostomopsis HANSEN, 1990 2 spp. AU
DISTRIBUTION: Paleo-endemic of Autralia (Queensland) (Fig. 26).
Nothing is known about the habitat.

Tribus: **Borborophorini** total: 4 spp.
Also this tribe belongs, as the precedent ones, to the primitive Sphaeridiinae. Both known genera are palaeo-endemics of the eastern Australia (New South Wales, Queensland) (Fig. 26). As the species of the precedent genera the beetles are terrestrial and all are recorded from decomposing organic matter (carrion, dung, leaf, litter), apparently confined to rainforest habitats.

Genus: *Borborophorus* HANSEN, 1990 3 spp. AU
DISTRIBUTION: Palaeo-endemic of eastern Australia (New South Wales, Queensland).
Nothing is known about the habitat.

Petasopsis HANSEN, 1990 1 sp. AU
DISTRIBUTION: Paleo-endemic of eastern Australia (Queensland) (Fig. 26).
Nothing is known about the habitat.

Tribus **Coelostomatini** total: 226 spp.
DISTRIBUTION: After HANSEN (1995) Coelostomatini are condsidered to be a monophyletic group within Sphaeridiinae. The tribe is composed of two subgroups of genera. The first group contains rather primitive genera characterized by a loosely segmented antennal club and by the first ventrite not being carinate medially. The second group contains the clearly derived genera characterized by a compact antennal club, and by the first ventrite carinate. The most primitive genera *Cyloma* and *Adolopus* are palaeo-endemics of New Zealand. The ancestor of the tribe might have arisen from the eastern part of the ancient continent of Gondwana during the Triassic, long time before Antarctica broke away from Pangaea.
One may observe an interesting link between both branches of evolution, starting mainly from Australian *Dactylosternum* to Oriental *Coelostoma* as a bridge between the two genera with the most varied species populations, and with the widest distribution. Several Australian *Dactylosternum* (*auripes, bakeri, dachinabadense, densepunctatum, helleri, indicum*) have the antennal club not compact but loosely segmented as in typical *Coelostoma*. In other species of that genus the elytral series are entirely reduced as in *Coelostoma* (*coelostomoides, detersum, fletcheri, illutum*). On the other hand some *Coelostoma* (whole subg. *Lachnocoelostoma*) have the first ventrite distinctly carinate as in *Dactylosternum*.

Most species are terrestrial or at least semiaquatic. They occur generally in moist habitats (edges of water, detritus, leafmould, rotting fruits etc.). Only a few genera are aquatic (*Coelostoma, Phaenostoma, Phaenonotum, Coeloctenus*). A few genera (*Lachnodacnum*,

Phaenonotum) frequnetly inhabit accumulations of water at the leaf bases of bromeliads. Considering the terrestrial habits of most species a passive migration (introduction by birds, cattle, and man) is supposed, and therefore likely to mask their origin. Most *Coelostomatines* are spread on the warmer climates. Barely 9 species occur in the Palearctic. Except for *Dactylosternum, Coelostoma* and *Coelofletium* all genera are more or less endemics

Genus: *Cyloma* SHARP, 1872 8 spp. AU
DISTRIBUTION: Palaeo-endemic of New Zealand and adjacent islands (Fig, 27).
Terrestrial. After BROUN 1893, 1910, HUDSON 1934, and ORDISH 1974 observed from leaf litter, sealion excreta, nests of seabirds, and at the roots of plants.

Adolopus SHARP, 1884 5 spp. AU
DISTRIBUTION: Palaeo-endemic of New Zealand (Fig. 27).
Terrestrial. Nothing is known about the habitat.

Toma HANSEN, 1999 1 sp. AF
DISTRIBUTION: Monospecific genus, widely spread over southern and western Africa (Fig. 27).
This species has been collected from moist secondary forests and plantations, frequently also taken at light.

Hydroglobus KNISCH, 1921 1 sp. NT
DISTRIBUTION: Monospecific genus from Argentina (La Plata) (Fig. 27).
Nothing is known about the habitat.

Cyclotypus SHARP, 1882 4 spp. AF,NT
DISTRIBUTION: Rather primitive member of Coelostomatini; known from Central America (Nicaragua, Panama). Two slightly aberrant species are recently described (HEBAUER 2002a) from Madagascar and Malawi (Fig. 27).
Nothing is known about the habitat.

Coelostoma BRULLÉ, 1835
Subg.: *Coelostoma* BRULLÉ, 1835 69 spp. AF,AU,OR,PA
Hammacoelostoma MOUCH., 1958 2 spp. AU,OR
Holooelostoma MOUCH., 1958 3 spp. AF,OR,PA
Lachnocoelostoma MOUCH., 1958 28 spp. AF,OR,PA.
(Comprehensive references: MOUCHAMPS, R. 1958, D´ORCHYMONT, A. 1936).
DISTRIBUTION: Within Coelostomatini this is the genus with the most varied species population, and after *Dactylosternum* this is the genus of Coelostomatini with the widest distribution; but most species are spread on Afrotropical (74) and Oriental (38). Only a few species are have radiated to Australia (3), the Palearctic (7), and by introduction into the Pacific Islands (3) (Fig. 27).
Coelostoma species are clearly aquatic, although avoiding deep or flowing water, living between decaying vegetation.

Coelofletium D´ORCHYMONT, 1925 3 spp. AU,OR, PC
DISTRIBUTION: This is a sister genus of *Elocomosta*, distributed in the eastern Oriental and Australian regions as far as the Fiji Is. and Hawaiian Is. (introduced) (Fig. 27).
The terrestrial habitats are decaying vegetation and mould.

Elocomosta HANSEN, 1989 1 sp. OR
DISTRIBUION: Monospecific genus; endemic of Sarawak (Fig. 27).
The habit is terrestrial in moist leaf mould in rainforest (HANSEN 1989).

Phanonotum SHARP, 1882 18 spp. AF,NA,NT
DISTRIBUTION: This is an exclusively Neotropical genus, only 2 species radiating as far as southern Nearctic. It replaces *Coelostoma* in the American continent (Fig. 27).
Besides *Coelostoma*, *Coeloctenus* and *Phaenostoma* this is an aquatic genus; the species inhabit frequently accumulations of water at leaf bases of bromeliads.

Phaenostoma D´ORCHYMONT, 1937 1 sp. NT
DISTRIBUTION: A monospecific Neotropical genus, known from Brazil, Panama, and Peru (Fig. 27).
Recorded from stagnant water.

Coeloctenus BALFOUR-BROWNE, 1939 1 sp. AF
DISTRIBUTION: Monospecific Afrotropical genus, decribed from the Lake Tanganyika (Fig. 27).
The type series was collected from shallow water, under stones and among weeds.

Lachnodacnum D´ORCHYMONT, 1937 3 spp. NT
DISTRIBUTION: A Neotropical genus, recorded from Brazil and Trinidad, where the species develop mainly in accumulations of water at leaf bases of bromeliads (Fig. 27)

Bourdonnaisia SCOTT, 1913 2 spp. AF
DISTRIBUTION: An endemic terrestrial genus of the Seychelles (Fig. 27).
The species are collected in humid forests among wet fallen leaves (SCOTT 1913).

Rhachiostethus D´ORCHYMONT, 1919 1 sp. OR
DISTRIBUTION: Monospecific terrestrial genus of Sabah (Fig. 27).
The holotype was collected in moist leafmould in rainforest (HANSEN 1989).

Dactylostethus D´ORCHYMONT, 1919 1 sp. OR
DISTRIBUTION: Monospecific genus of Sumatra (Fig. 27).
Nothing is known about the habitat.

Galapagodacnum D´ORCHYMONT, 1937 1 sp. NT
DISTRIBUTION: Monospecific endemic Neotropical genus from the Galapagos Islands (Fig. 27).
Nothing is known about the habitat.

Dactylosternum WOLLASTON, 1854 71 spp. AF,AU,NA,NT,OR,PA,PC
(Comprehensive references: BALFOUR-BROWNE, J. 1942, HEBAUER, F. 2001a).
DISTRIBUTION: This is the widest distributed genus of Coelostomatini, spread on all geographic regions as far as the Pacific isles, but only a few species have crossed the equator to north. One species (*abdominale*) is cosmopolitan. The pylogenetic position of this genus is rather problematic and unsolved. The genus is possibly not a monophyletic.
The species are terrestrial; they predominantly inhabit compost-heaps.

Kruia SPANGLER & PERKINS, 1981 1 sp. AF
DISTRIBUTION: Monospecific genus; endemic of Madagascar (Fig. 27).
Type specimen collected at 500-1000 mNN.
Nothing is known about the habitat.

Hemikruia HANSEN & HEBAUER, 2002 1 sp. AF
DISTRIBUTION: Monospecific genus; endemic of Madagascar (Fig. 27).
Nothing is known about the habitat.

Tribus: **Protosternini** total: 18 spp.
This small tribe of Hydrophilidae is poor in species, standing between Sphaeridiini and Megasternini. The monophyly is supported by the presence of an anterolateral arcuate ridge on the metasternum (HANSEN 1995). All species are distributed in the Oriental region as far as Mauritius in the West, and from Irian Jaya in the East.
The habitats are terrestrial; the beetles live in different kinds of decaying organic matter.

Genus: *Rhombosternum* BALFOUR-BROWNE, 1942 8 spp. OR,AU
DISTRIBUTION: All species are spread on Oriental; one species is described from Irian Jaya.
The types are labelled "from dead tree".

Protosternum Sharp, 1890 9 spp. OR,AF
DISTRIBUTION: All known species are spread through the Oriental region; one species is described from Mauritius.
The habits are terrestrial; in different kinds of decaying organic matter: "under bark","sieving of trunk of Aloe", "dead trees trunks", "chicken manure" (label indications).

Mucetum D´ORCHYMONT, 1 sp. OR
(Comprehensive reference: BAMEUL, F. 1997).
DISTRIBUTION: Monospecific genus, known only from Singapore.
Habitat unknown.

Tribus: **Omicrini** total: 91 spp.

After HANSEN (1995) this is undoubtedly a monospecific tribe of very small predominantly tropical Sphaeridiinae.
All known species occur in terrestrial but very moist habitats, inhabiting various kinds of decomposing plant debris.

Genus: *Heteryon*, SHARP, 1882 1 sp. NT
DISTRIBUTION: Monospecific endemic of Mexico.
Nothing is known about the habitat.

Oreomicrus MALCOLM, 1980 3 spp. OR
(Comprehensive reference: BAMEUL, F. 1994a).
DISTRIBUTION: An Oriental genus, until known from Sarawak, West Malaysia, and Nepal
Nothing is known about the habitat.

Tylomicrus SCHÖDL, 1995 1 sp. OR
DISTRIBUTION: Monospecific endemic from the Malayan peninsula.
Nothing is known about the habitat.

Paromicrus SCOTT, 1913 14 spp. AF,OR,PA
DISTRIBUTION: A rather successful genus, distributed from Japan all over the Orient, and as far as the Seychelles in the West.
The species live in different kinds of decaying organic matter in humid forests, bark, log or leaf litter (HANSEN 1991).

Aculomicrus SMETANA, 1990 4 spp. AF,OR
DISTRIBUTION: The distribution range of this small genus seems to be exremely disjunct. The geographical centres are Neotropical (Central America until Colombia) and Oriental (Sulawesi). An introduction to Sulawesi is not an impossible explanation.
The species live in various kinds of rotting plant debris (HANSEN 1991).

Nannomicrus BAMEUL, 1991 1 sp. OR
DISTRIBUTION: A monospecific endemic of Sri Lanka.
The types are collected "in forests". N. pulchellus was sieved from decayed moist wood in a forest (BAMEUL 1991).

Psalitrus D´ORCHYMONT, 1919 28 spp. AF, OR
(Comprehensive references: BAMEUL, F. 1991a, b, 1992a, b, 1986).
DISTRIBUTION: This genus includes a lot of species, spread mainly on Oriental. Some species are also described from Africa and the Mascarene Is. Only one species is known from Japan.
The habit is terrestrial; in leaf and log litter, rotted bark with fungi, moss etc. in rain forest (Hansen 1990b).

Litrosurus D´ORCHYMONT, 1925 1 sp. OR
DISTRIBUTION: Monospecific endemic of Sulawesi.
Nothing is known about the habitat.

Stanmalcolmia BAMEUL, 1993 1 sp. OR
DISTRIBUTION: Monospecific endemic of Sulawesi.
Nothing is known about the habitat.

Omicrogiton D´ORCHYMONT, 1919 4 spp. AF, AU, OR
DISTRIBUTION: A genus consisting of only a few species with widely separated occurrence: Mascarene Is., Indonesia, Vanuatu (New Hebrides). Almost all localities are islands; so the route of dispersal might have effected by ornithophoresis.
As with most Omicrini these species are terrestrial living in decomposing plant material, they have been sieved from a very moist stump of a tree (BAMEUL 1986).

Mircogioton D´ORCHYMONT, 1937 5 spp. OR
DISTRIBUTION: An Oriental to Australian genus, recorded up to now from India (Sikkim), Myanmar, Laos, Vietnam, Sabah, and Malayan peninsula, further (HEBAUER 2006) also from Papua New Guinea.
The habitat is terrestrial as in most Omicrini.
(Comprehensive reference: BAMEUL, F. 1994b).

Lala HANSEN, 1999 1 sp. NT
DISTRIBUTION: Monospecific endemic of Brazil.
Nothing is known about the habitat of this species.

Omicrus SHARP, 1879 20 spp. AF, NT
(Comprehensive reference: BAMEUL, F. 1993).
DISTRIBUTION: The largest genus of the tribe is primarily Neotropical. It is widely distributed in South- and Central America as far as southern Florida.
Three species are recorded from the Pacific Is. (Marquesas Is. and Hawaiian Is.; introduced).
The habitat is terrestrial; in leaf litter, rotten wood, fruit and dung (SMETANA 1975).

Peratogonus SHARP, 1884 3 spp. OR,PA
DISTRIBUTION: Only three species are known of this genus, distributed on Oriental (Java, North India) and Palearctic (Japan and Taiwan).
The Japanese specimens are collected from leaf litter (SATÔ 1960).

Noteropagus D´ORCHYMONT, 1919 4 spp. OR
DISTRIBUTION: This genus has as distribution pattern similar to that of Omicrus, i.e. mainly Oriental and Australian to Pacific (Fiji, Hawaii; introduced). Only one species is recorded from the Mascarene Is. (La Réunion, Mauritius).
No details are known about the habits.

Tribus: **Megasternini** total: 473 spp.
After HANSEN (1995) this large cosmopolitan tribe is a distinctive and no doubt monophyletic group (HANSEN 1995). The recent distribution of many genera and species is only explicable by introduction, mainly caused by cattle transport and ornithophoresis. So some predominantly West Palearctic *Cercyon* occur as far as Australia, e.g. *Cercyon quisquilius*. The colonization of the volcanic isles, especially the Pacific is definitely caused by introduction.
Most Megasternini are terrestral. They inhabit mainly decaying organic matter, e.g. dung, carrion, compost, leaf litter, rotten fruits, fungi etc. Some *Cercyon* prefer litter and dung of deer or venison in forests. Another group (*Cercyodes, Ercycon*, also some *Cercyon*) occurs under seaweed.

Genus: *Cycreon* D´ORCHYMONT, 1919 1 sp. OR
DISTRIBUTION: Monospecific endemic of Sumatra.
Nothing is known about the habitat.

Cercyodes BROUN, 1886 2 spp. AU
DISTRIBUTION: Endemic of New Zealand and Tasmania.
Terrestrial; under seaweed. *C. kingensis* is also recorded from forest litter (BROUN, 1886; HANSEN, 1990b)

Ercycodes HANSEN, 1990 2 spp. AU
DISTRIBUTION: Endemic of Australian region (Australia, NSW, VIC), Tasmania.
Under seaweed on the beach (HANSEN 1991).

Notocercyon BLACKBURN, 1898 2 spp. AU
DISTRIBUTION: Endemic of Australian region (South Australia and Tasmania).
Terrestrial; collected in various kinds of decaying organic matter; frequently in rain forest (log litter).

Ceronocyton HANSEN, 1990 3 spp. AU
DISTRIBUTION: Endemic of Australian region (East Australia).
Terrestrial; in decomposing organic matter; in rainforest (HANSEN 1990b).

Cenebriophilus HANSEN, 1990 2 spp. AU
DISTRIBUTION: Endemic of Australia (NSW, QLD, VIC).
Terrestrial; in litter, dung, carrion, in rainforest and wet sclerophyll forest (HANSEN, 1990b).

Chledocyon HANSEN, 1990 5 spp. AU
DISTRIBUTION: Endemic of Australia (QLD, SWA).
Terrestrial; in various kinds of litter, dung, carrion, fungi; in forest; heath or dense bush (HANSEN 1990b).

Pseudoosternum HANSEN, 1990 3 spp. AU
DISTRIBUTION: Endemic of Australia (NA).
Terrestrial; in various kinds of litter, in humid forest (rainforest) (HANSEN 1990b).

Parastromus BALFOUR-BROWNE, 1948 6 spp. AF
(Comprehensive reference: BALFOUR-BROWNE, J. 1948).
DISTRIBUTION: Afrotropical genus; widely distributed in Africa south of Sahara.
Terrestrial; sifted from litter.

Armostus SHARP, 1890 11 spp. AU,OR,PA
DISTRIBUTION: Predominantly Oriental. Only one species is known from Japan; two species are recorded from Irian Jaya.
Terrestrial; the habitat is unknown, but some specimens are collected at light in gardens.

Morastus D´ORCHYMONT, 1926 1 sp. OR
DISTRIBUTION: Monospecific endemic of South India.
Nothing is known about the habitat.

Pilocnema HANSEN, 1990 19 spp. AU,OR
(Comprehensive references: HANSEN, M. 2003; HEBAUER, F. 2004).
DISTRIBUTION: An almost exclusively New Guinean genus. Barely one species is recorded from Oriental (Philippines).
Terrestrial; in litter in rainforest (HANSEN 1990b).

Cetiocyon HANSEN, 1990 4 spp. AU
DISTRIBUTION: An exclusively Australian genus (Australia-QLD, Irian Jaya, Papua New Guinea, New Britain).
Nothing is known about the habitat.

Platycyon HANSEN, 1990 26 spp. AU
(Comprehensive reference: HEBAUER, F. 2000).
DISTRIBUTION: A genus with a richly varied species population. It is an exclusively New Guinean genus (Irian Jaya, Papua, and New Britain).
Terrestrial; in rainforest.

Oreocyon HEBAUER, 2002 1 sp. OR
DISTRIBUTION: Monospecific endemic of Nepal.
Nothing is known about the habitat.

Peltocercyon D´ORCHYMONT, 1925 2 spp. OR
DISTRIBUTION: Oriental genus, known from Singapore, Sri Lanka, Sumatra, Vietnam.
Nothing is known about the habitat.

Acarion HEBAUER, 2003 1 sp. AF
DITRIBUTION: Monospecific endemic of Madagascar.
Nothing is known about the habitat.

Anchorosternum JIA, Wu&PU, 2001 1 sp. PA
DISTRIBUTION: Monospecific endemic of China (Nanning, Guangdong, Guangxi).
Nothing is known about the habitat.

Cercyon Leach, 1817
The largest genus of Megasternini, probably composed of several genera waiting for a comprehensive generic revision. At present the genus is divided into 10 subgenera.

Subg.: *Acycreon* D´ORCHYMONT, 1942	4 spp.	AF,OR
Arcocercyon HEBAUER, 2002	10 spp.	AF
Paracycreon D´ORCHYMONT, 1942	14 spp.	AF,OR,PA,PC
Cercyon LEACH, 1817	184 spp	AF,AU,NA,NT,OR,PA,PC
Dicyrtocercyon GANGLBAUER, 1904	2 spp.	NA,OR,PA
Prostercyon SMETANA, 1978	1 sp.	NA
Paracercyon SEIDLITZ, 1888	6 spp.	AU,NA,OR,PA
Clinocercyon D´ORCHYMONT, 1942	24 spp.	AF,OR
Oedocercyon D´ORCHYMONT, 1942	1 sp.	AF
Himalcercyon HEBAUER, 2002	1 sp.	OR
Conocercyon HEBAUER, 2003	3 spp.	AF

The species are distributed all over the world and inhabit almost all types of habitats, predominantly decomposing organic matter. Some species are even adapted to brackish water.

Deltostethus SHARP, 1882 4 spp. NA,NT
DISTRIBUTION: Predominantly Neotropical (Central America); only one species is spread on North America as far as Canada. A revision of the genus with description of several new species is in press (FIKÁCEK, in litt.).
Habitat: Terrestrial, in various kinds of organic matter (SMETANA 1998).

Agna SMETANA, 1978 2 spp. NA,NT
DISTRIBUTION: An exclusively Nearctic genus, distributed from Mexico to South-east U.S.A, west as far as California.
Terrestrial; in decaying larger cacti (SMETANA 1978).

Agnaeformia SHATROVSKIY, 1989 1 sp. PA
DISTRIBUTION: Monospecific endemic of Far East Russia (Primorskiy Kraj).
Nothing is known about the habitat.

Australocyon HANSEN, 1990 19 spp. AU, OR
(Comprehensive reference: HANSEN, M. 2003).
DISTRIBUTION: This genus with a richly varied species population is not only spread on the Australian region (as supposed in the past), but it is recently also recorded from Oriental and even from Central- and South America (SHORT & HEBAUER 2006).
Most species are observed being terrestrial and collected from litter, dung, and carrion in rainforest (HANSEN 1990, 2003).

Kanala BALFOUR-BROWNE, 1939 2 spp. AU
DISTRIBUTION: ?Palaeo-endemic of New Caledonia (Paompai, Mt. Jgnambi).
Terreestrial "in rotten wood", and "in base of bromeliad leaves (BALFOUR-BROWNE).

Nipponocercyon SATÔ, 1963 2 spp. PA
DISTRIBUTION: Endemic of Japan (Honshu).
Terrestrial; in leaf litter (SATÔ 1963).

Colerus HANSEN, 1999 1 sp. AF
DISTRIBUTION: Endemic of Madagascar (Perinet).
Nothing is known about the habitat

Moraphilus D´ORCHYMONT, 1925 1 sp. NT
DISTRIBUTION: Monospecific endemic of French Guinea.
Habitat: Terrestrial, in dung and carrion in primary rainforest (J. HUIJBREGTS, in litt.).

Pseudocercyon D´ORCHYMONT, 1926 1 sp. OR
DISTRIBUTION: Monospecific endemic of Tonkin.
After J. HUIJBREGTS (in litt.) "taken on bamboo".

Gillisius D´ORCHYMONT, 1925 2 spp. OR
DISTRIBUTION: Endemic of Southern India (Tamil Nadu).
Nothing is known about the habitat

Pseucyon D´ORCHYMONT, 1948 1 sp. AF
DISTRIBUTION: Monospecific endemic of Ethiopia.
The beetles live "in rotten woods, partricularly in a trunk of an arboreous Euphorbia" (D´ORCHYMONT 1948).

Pelosoma MULSANT, 1844 21 spp. AF,AU,NT,OR
DISTRIBUTION: This genus with a richly varied species population is mainly spread on Neotropical. Some species however occur also in Indonesia (Sumatra, Buru), and in the Australian region (Papua, Melanesia). One species is known from western Africa (Fig. 28).
The beetles inhabit leaf litter and rotten cacti (SMETANA 1978, 1984).

Nitidulodes SHARP, 1882 1 sp. NT
DISTRIBUTION: Monospecific endemic of Central America (Nicaragua, Panama).
Apparently terrestrial, "in lily bloom" (label indication).

Pelocyon Balfour-Browne, 1950 1 sp. AF
DISTRIBUTION: Monospecific genus, but widely spread on Africa.
Nothing is known about the habitat

Paroosternum Scott, 1913 5 spp. AF, AU, OR, PA, PC
DISTRIBUTION: The genus was partly confused with *Oosternum* for a long time. Recent investigations (Hansen 1999; Hebauer 2006) have redefined both genera and described some new species, so that the present distribution pattern of *Paroosternum* is recognized reaching as far as Australia (Fig. 28).
Little is known about the habitat. *P. ecarinatum* was collected from "cut grass" (D´Orchymont 1942).

Kahanga Hansen, 1999 1 sp. OR
DISTRIBUTION: Monospecific endemic of the Malayan Peninsula (Johore, Kahang).
The type specimen was collected by a light trap. Nothing is known about the habitat.

Bulbonotum Hansen, 1999 3 spp. OR
DISTRIBUTION: An Oriental genus close to *Oosternum*, which is known up to now from the Batu Is. and Nias Is., also fom Sarawak, the Philippnes and from Thailand. *B. myophallus* was collected from pitfall traps with fish bait.

Sacosternum Hansen, 1989 1 sp. NT
DISTRIBUTION: Monospecific endemic of Central America (Panama).
Nothing is known about the habitat.

Oosternum Sharp, 1882 15 spp. NA,NT,OR,PA
DISTRIBUTION: This genus is widely spread on the southern hemisphere, reaching as far as Japan, the southern U.S.A, and the Azores. In a current revision of the genus many previously undescribed species are recognized and designated (Fig. 28).
The species inhabit various kinds of decaying organic matter. After Smetana (1978) one species (*attacomis*) may be confined to nests of leaf cutting ants of the genus *Atta* F.

Motonerus Hansen, 1989 1 sp. NT
DISTRIBUTION: This is an exclusively Neotropical genus confined to Central America (Costa Rica, El Salvador, and Mexico). A recent revision (Fikacek & Short 2006) presents seven new species.
M. obscurus is observed in "cloud forest" (Hansen 1999).

Emmidolium D´Orchymont, 1937 1 sp. AF,OR
DISTRIBUTION: Monospecific genus, up to now recorded from Taiwan.
Terrestrial, in dung (J. Huijbregts, in litt.).

Quadristernum Balfour-Browne, 1950 1 sp. AF
DISTRIBUTION: Monospecific endemic of Rwanda.
Nothing is known about the habitat.

Delimetrium Hansen, 1999 1 sp. AF
DISTRIBUTION: Monospecific endemic of the African Cape Province.
The species was sifted from different kinds of litter (Hansen 1999).

Tectosternum Balfour-Browne, 1958 3 spp. AF,NA
DISTRIBUTION: This genus has a disjunctive distribution pattern. The centres of distribution are two, one Afrotropical (Central- and West Africa), the second Nearctic (Canada and U.S.A.).
The habitat is terrestrial, decaying organic matter (damp leaf litter) (Smetana 1978, 1984).

Pacrillum D´Orchymont, 1941 4 spp. PA,OR
DISTRIBUTION: Two disjunctive geographical centres are known, both in the Oriental, one in China (Fujian, Sichuan, Liaoning), the other in the Philippines (Luzon, Imugan).

Megasternum Mulsant, 1844 6 spp. AF,NA,PA
DISTRIBUTION: Widely spread on Palearctic and Nearctic. Barely one species occur in Afrotropical (Tanzania).
The species inhabit various kinds of decaying organic matter, frequently at the edges of stagnant water.

Cercillum KNISCH, 1921 1 sp. AF
DISTRIBUTION: Monospecific endemic of Africa (West Africa).
Nothing is known about the habitat.

Cycrillum KNISCH, 1921 1 sp. NT
DISTRIBUTION: Monospecific genus of Central America, reaching as far as southern U.S.A.
The species inhabits rotting leaf litter, cacao pod litter, also human dung (SMETANA 1984).

Pachysternum MOTSCHULSKY, 1863 21 spp. AF,OR,PA
(Comprehensive references: D´ORCHYMONT, A. 1926c, FIKÁCEK & BOUKAL, 2004, FIKÁCEK & SHORT, 2006, ROCCHI & BORDONI & BRAMANTI, 2005-2006).
DISTRIBUTION: This genus with richly varied population is widespread in the Oriental Region (from India across South-east Asia, southern China, as far as the Philippines), Afrotropical and Palearctic (Mongolia, Siberia, Far East Russia, and Japan). One species (*P. capense*) is recently recorded from Greece and Italy.

Cyrtonion HANSEN, 1989 1 sp. AF
DISTRIBUTION: Monospecific endemic of Ghana.
Terrestrial, in moist leaf mould in rainforest (HANSEN 1989).

Cryptopleurum MULSANT, 1844 24 spp. AF,AU,NA,NT,OR,PA
DISTRIBUTION: This genus with richly varied species populations is known from all major geographical regions except South America. Some species have been introduced into the Pacific Is. (Hawaii Islands, Tubuai Islands - *evansi*) (HANSEN 1995a), and in the Nearctic (Canada, U.S.A. - minutum, subtilis) (SMETANA 1978).

Pyretes BALFOUR-BROWNE, 1950 1 sp. AF
DISTRIBUTION: Monospecific genus, only known from Central- and West Africa (DR Congo, Rwanda, Burundi, Cameroon).
Nothing is known about the habitat.

Tribus: **Sphaeridiini** total: 42 spp.
The tribe is present in all major geographic regions, though the centres of distribution are Afrotropical and Oriental. The Nearctic species are introduced there. Only a single species (*braziliense*) is recorded from Neotropical. In most cases the way of migration is caused by cattle transport.
The species inhabit dung of mammals, but also other kinds of decaying organic matter.

Genus: *Sphaeridium* FABRICIUS, 1775 42 spp. AF,AU, NA, NT, OR,PA,PC
(Comprehensive references: BALFOUR-BROWNE, J. 1950a, b; BERGE HENEGOUWEN, A. 1992; D´ORCHYMONT, A. 1943).
DISTRIBUTION: About 50% (27 species) are spread on Africa. Only 9 species are Oriental. The commonest species *S. scarabaeoides* is introduced to Africa and to the Hawaiian Is. The Australian species (*discolor, flavomaculatum, hujbregtsi*) are possibly early Gondwana species.

3. Tables

3.1 Genera

At present there are known 3151 valid species of Hydrophiloidea distributed in 181 genera.

Distribution	Genera	aquatic	"endemic" %	terrestrial*	"endemic" %	
Afrotropical	62	22	35.4	30	11	36.7
Australian	65	34	52.3	34	24	70.6
Nearctic	32	2	6.3	8	-	-
Neotropical	63	28	444	25	14	56.0
Oriental	74	28	38.9	38	18	47.4
Palearctic	42	2	4.8	13	2	15.4
Pacific	11	-	-	7	-	-

*) = Sphaeridiinae, without *Coelostoma, Coeloctenus, Phaenonotum, Phaenostoma*.

The number of species and also the rates of endemics are quite different in the zoogeographic region, strongly dependant from the climate and the isolated position. Generally there is seen a higher rate of endemics in the south hemisphere than in the north hemisphere.

3.2 STATISTICS - HYDROPHILOIDEA (updated: 2005)

Annotation: Differences between the total number of a species of a genus and the totals for species distributed over the seven geographical regions are because many species occur in more than one region.
Some confusion concerning the numbers of species of the Oriental and Australian regions is because the zoogeographical regions overlap at the territory of New Guinea (Irian Jaya [ORIENTAL] - Papua [AUSTRALIAN]).
The family-group names are presented systematically, the genera alphabetically.

Zoogeographic region Genus	n	AF 658	AU 433	NA 306	NT 661	OR 685	PA 544	PC 20
HELOPHORIDAE								
Helophorus	186	3	-	41	4	8	149	-
EPIMETOPIDAE								
Epimetopus	19	-	-	4	18	-	-	-
Eumetopus	8	-	-	-	-	8	-	-
Eupotemus	2	2	-	-	-	-	-	-
GEORISSIDAE								
Georissus	77	33	5	2	2	24	13	-
HYDROCHIDAE								
Hydrochus	177	38	38	31	41	8	28	-
SPERCHEIDAE								
Spercheus	18	9	3	-	2	6	4	-
HYDROPHILIDAE								
Horelophinae								
Horelophus	1	-	1	-	-	-	-	-
Horelophopsinae								
Horelophopsis	2	-	1	-	-	-	1	-
Hydrophilinae								
Sperchopsini								
Ametor	5	-	-	2	-	2	4	-
Anticura	1	-	-	-	1	-	-	-
Cylomissus	1	-	1	-	-	-	-	-
Hydrocassis	15	-	-	-	-	10	7	-
Sperchopsis	1	-	-	1	-	-	-	-
Berosini								
Allocotocerus	26	13	4	-	-	10	-	-
Berosus	265	58	38	24	112	27	27	-
Derallus	18	-	-	1	18	-	-	-
Hemiosus	32	-	-	-	33	-	-	-
Regimbartia	10	8	1	-	-	3	2	-
Chaetarthriini								
Amphiops	20	8	5	-	-	11	3	-
Apurebium	1	-	-	-	1	-	-	-
Chaetarthria	48	1	1	14	29	4	2	-
Guyanobius	2	-	-	-	2	-	-	-
Hemisphaera	5	3	-	-	-	-	4	-
Thysanarthria	10	2	-	-	-	13	1	-
Venezuelobium	2	-	-	-	2	-	-	-
Anacaenini								
Anacaena	57	18	1?	4	23	17	15	-
Crenitis	42	7	1	11	2	7	10	-

Enigmata	2	2	-	-	-	-	-	-
Grodum	2	2	-	-	-	-	-	-
Hebauerina	1	-	-	-	-	1	-	-
Notohydrus	5	-	5	-	-	-	-	-
Notionotus	13	-	-	-	7	11	-	-
Paracymus	81	17	13	14	30	9	8	1
Paranacaena	36	-	35	-	-	2	-	-
Phelea	1	-	1	-	-	-	-	-
Laccobiini								
Arabhydrus	1	1	-	-	-	-	-	-
Beralitra	2	-	-	-	2	-	-	-
Gentilina	1	-	1	-	-	-	-	-
Hydrophilomima	3	-	-	-	-	3	-	-
Laccobius	218	25	45	24	14	79	97	-
Oocyclus	29	-	-	-	14	18	-	-
Ophthalmocyclus	1 -	-	-	-	1	-	-	
Pelthydrus	55	-	-	-	-	53	2	-
Pseudopelthydrus	1 -	-	-	-	1	-	-	
Scoliopsis	1	-	-	-	-	1	-	-
Tritonus	1	1	-	-	-	-	-	-
Hydrophilini								
Acidocerina								
Acidocerus	1	1	-	-	-	-	-	-
Agraphydrus	18	19	1	-	-	139	5	-
Chasmogenus	36	17	2	-	11	5	3	-
Cymbiodyta	29	-	-	23	9	-	1	-
Dieroxenus	1	-	-	-	1	-	-	-
Enochrella	3	-	-	-	-	3	-	-
Enochrus	214	60	32	21	54	31	41	3
Gemelus	1	-	-	-	1	-	-	-
Guaramacalus	2	-	-	-	2	-	-	-
Helobata	9	-	-	1	9	-	-	-
Helochares	173	99	22	2	24	42	10	-
Helocombus	1	-	-	1	-	-	-	-
Helopeltarium	1	-	-	-	-	1	-	-
Megagraphydrus	10	-	-	-	-	15	-	-
Omniops	2	-	2	-	-	-	-	-
Peltochares	1	1	-	-	-	-	-	-
Quadriops	6	-	-	-	6	-	-	-
Troglochares	1	-	-	-	1	-	-	-
Globulosina								
Globulosis	1	-	-	-	1	-	-	-
Hydrobiusina								
Hybogralius	1	-	1	-	-	-	-	-
Hydramara	1	-	-	-	1	-	-	-
Hydrobius	8	-	-	2	-	-	6	-
Limnoxenus	6	1	1	-	-	-	2	2
Lymnocyclus	1	-	1	-	-	-	-	-
Hydrophilina								
Hydrobiomorpha	54	15	5	1	35	10	-	-
Hydrochara	23	5	-	8	-	3	7	-
Hydrophilus	48	5	10	3	16	10	9	-
Sternolophus	9	4	3	-	-	4	1	-
Tropisternus	61	-	-	17	62	-	-	-
Sphaeridiinae								
Rygmodini								
Cylorgymus	2	1	-	-	1	-	-	-
Eurygmus	1	-	1	-	-	-	-	-
Pseudohydrobius	2	-	2	-	-	-	-	-
Pseudorygmodus	1	-	-	-	1	-	-	-

Rygmodus	11	-	11	-	-	-	-	-
Rygmostralia	1	-	1	-	-	-	-	-
Saphydrus	3	-	3	-	-	-	-	-
Tormissini								
Afrotormus	2	2	-	-	-	-	-	-
Exydrus	1	-	1	-	-	-	-	-
Hydrostygnus	1	-	1	-	-	-	-	-
Tormissus	2	-	2	-	-	-	-	-
Tormus	3	-	3	-	-	-	-	-
Andotypini								
Andotypus	2	-	-	-	2	-	-	-
Coelostomopsis	2	-	2	-	-	-	-	-
Borborophorini								
Borborophorus	3	-	3	-	-	-	-	-
Petasopsis	1	-	1	-	-	-	-	-
Coelostomatini								
Adolopus	5	-	5	-	-	-	-	-
Badioglobus	1	-	-	-	1	-	-	-
Bourdonnaisia	2	2	-	-	-	-	-	-
Coeloctenus	1	1	-	-	-	-	-	-
Coelofletium	3	1	1	-	-	2	-	-
Coelostoma	102	74	3	-	-	38	7	3
Cyclotypus	4	2	-	-	2	-	-	-
Cyloma	8	-	8	-	-	-	-	-
Dactylosternum	71	13	19	3	21	24	2	4
Dactylostethus	1	-	-	-	-	1	-	-
Elocomosta	1	-	-	-	-	1	-	-
Galapagodacnum	1	-	-	-	1	-	-	-
Hemikruia	1	1	-	-	-	-	-	-
Hydroglobus	1	-	-	-	1	-	-	-
Kruia	1	1	-	-	-	-	-	-
Lachnodacnum	3	-	-	-	3	-	-	-
Phaenonotum	18	-	-	2	16	-	-	-
Phaenostoma	1	-	-	-	1	-	-	-
Rhachiostethus	1	-	-	-	-	1	-	-
Toma	1	1	-	-	-	-	-	-
Protosternini								
Mucetum	1	-	-	-	-	1	-	-
Protosternum	9	1	-	-	-	9	-	-
Rhombosternum	8	-	1	-	-	7	-	-
Omicrini								
Aculomicrus	4	-	-	-	3	1	-	-
Heteryon	1	-	-	-	1	-	-	-
Lala	1	-	-	-	1	-	-	-
Litrosurus	1	-	-	-	-	1	-	-
Mircogioton	5	-	-	-	-	5	-	-
Nannomicrus	1	-	-	-	-	1	-	-
Noteropagus	4	1	1	-	-	5	-	1
Omicrogiton	4	1	1	-	-	2	-	-
Omicrus	20	1	-	-	16	-	-	3
Oreomicrus	3	-	-	-	-	3	-	-
Paromicrus	14	2	-	-	-	11	1	-
Peratogonus	3	-	-	-	-	2	1	-
Psalitrus	28	6	-	-	-	20	1	-
Stanmalcolmia	1	-	-	-	-	1	-	-
Tylomicrus	1	-	-	-	-	1	-	-
Megasternini								
Acarion	1	1	-	-	-	-	-	-
Agna	2	-	-	1	-	-	-	-
Agnaeformia	1	-	-	-	-	-	1	-

Anchorosternum	1	-	-	-	-	-	1	-
Armostus	11	-	4	-	-	11	1	-
Australocyon	19	-	6	-	7	6	-	-
Bulbonotum	3	-	-	-	-	3	-	-
Cenebriophilus	2	-	2	-	-	-	-	-
Cercillum	1	-	-	-	1	-	-	-
Ceronocyton	3	-	3	-	-	-	-	-
Cercyodes	2	-	2	-	-	-	-	-
Cercyon	203	64	24	38	24	108	67	2
Cetiocyon	4	-	4	-	-	-	-	-
Chledocyon	5	-	5	-	-	-	-	-
Colerus	1	1	-	-	-	-	-	-
Cryptopleurum	24	8	3	5	2	9	4	1
Cycreon	1	-	-	-	-	1	-	-
Cycrillum	1	-	-	-	1	-	-	-
Cyrtonion	1	1	-	-	-	-	-	-
Delimetrium	1	1	-	-	-	-	-	-
Deltostethus	4	-	-	-	4	-	-	-
Emmidolium	1	1	-	-	-	1	-	-
Ercycodes	2	-	2	-	-	-	-	-
Gillisius	2	-	-	-	-	2	-	-
Kahanga	1	-	-	-	-	1	-	-
Kanala	2	-	2	-	-	-	-	-
Megasternum	7	1	-	3	-	-	4	-
Moraphilus	1	-	-	-	1	-	-	-
Morastus	1	-	-	-	-	1	-	-
Motonerus	1	-	-	-	1	-	-	-
Nipponocercyon	2	-	-	-	-	-	2	-
Nitidulodes	1	-	-	-	1	-	-	-
Notocercyon	2	-	2	-	-	-	-	-
Oosternum	15	1	-	4	4	12	4	1
Oreocyon	1	-	-	-	-	1	-	-
Pachysternum	21	11	-	-	-	8	2	-
Pacrillum	3	-	-	-	-	2	2	-
Parastromus	6	6	-	-	-	-	-	-
Paroosternum	5	1	1	-	-	6	1	1
Pelocyon	1	1	-	-	-	-	-	-
Pelosoma	21	2	3	-	15	2	-	-
Peltocercyon	2	-	-	-	-	2	-	-
Pilocnema	19	-	18	-	-	1	-	-
Platycyon	28	-	28	-	-	-	-	-
Pseucyon	1	1	-	-	-	-	-	-
Pseudocercyon	1	-	-	-	-	1	-	-
Pseudoosternum	3	-	3	-	-	-	-	-
Pyretus	1	1	-	-	-	-	-	-
Quadristernum	1	1	-	-	-	-	-	-
Sacosternum	1	-	-	-	1	-	-	-
Tectosternum	3	2	-	1	-	-	-	-
Sphaeridiini								
Sphaeridium	42	27	2	4	1	9	9	1

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Updated checklists of some isles and archipelagos

MALGASY AREA - Hydrophiloidea (updated: 2005)

(* = endemic; Co=Comores; Ma= Mauritius; Re=Rèunion; Ro=Rodriguez; Se=Seychelles: Pal.= Palearctic).

Species	Mad	AF	OR	Remarks
Berosus bergrothi RÉGIMBART, 1900	+			Se
Berosus bidenticulatus MULSANT&REY, 1858	+			Se
Berosus cariniceps RÉGIMBART, 1903	*			
Berosus cribrosus FAIRMAIRE, 1897	*			
Berosus cuspidatus ERICHSON, 1843	+	+		
Berosus dilutus RÉGIMBART, 1903	*			
Berosus inermis FAIRMAIRE, 1896	+			Se
Berosus madagascariensis SCHÖDL, 1995	+	+		
Berosus marmoratus RÉGIMBART, 1903	*			
Berosus mixtus WATERHOUSE, 1876				Ma, Ro
Berosus nudicollis SCHÖDL, 1994	+			Se
Berosus obscuriceps FAIRMAIRE, 1886	*			
Berosus villosulus RÉGIMBART, 1903	+	+		
Berosus vinsoni BALFOUR-BROWNE, 1954				Re*
Berosus vitticollis BOHEMAN, 1851	+	+		
Regimbartia compressa (BOHEMAN, 1851)	+	+		
Regimbartia denticulata (MULSANT, 1853)	*			
Regimbartia inflata (BRULLÉ, 1835)	+			Ma, Se
Regimbartia nilotica (SHARP, 1903)	+	+		
Regimbartia obsoleta (RÉGIMBART, 1906)	+	+		
Allocotocerus sisarus (ORCHYMONT, 1939)	*			
Allocotocerus sobrinus (ORCHYMONT, 1942)	*			
Allocotocerus subopacus (RÉG., 1903)	*			
Hemisphaera liliputana (RÉG., 1903)	*			
Thysanarthria atriceps (RÉGIMBART,1903)	+	+		
Amphiops confusus RÉGIMBART, 1903	*			
Amphiops globus ERICHSON, 1843	+	+		
Amphiops lasioides RÉGIMBART, 1903	+	+		
Amphiops senegalensis (CASTELNAU, 1840)	+	+		
Paracymus alluaudianus SCOTT, 1913				Se*,?Re, Ro?
Paracymus chalceus RÉGIMBART, 1903	+	+		
Paracymus minor RÉGIMBART, 1903	+	+		
Anacaena angulata KOMAREK, 2004	*			
Anacaena fallax KOMAREK, 2004	*			
Anacaena gracilipalpis KOMAREK, 2004	*			
Anacaena lutea KOMAREK, 2004	*			
Anacaena luticola HEBAUER, 2002	*			
Anacaena mascarena HEBAUER, 2002	*			
Anacaena obscura KOMAREK, 2004	*			
Anacaena parvicristata KOMAREK, 2004	*			
Anacaena polita KOMAREK, 2004	*			
Anacaena sucinea KOMAREK, 2004	*			
Enigmata brunnea HANSEN, 1999	*			
Enigmata foveata KOMAREK, 2005	*			
Laccobius algiricus HANSEN, 1999	+	+		
Laccobius curvipes RÉGIMBART, 1903	+			Re
Laccobius kavanaughi GENTILI, 1998	*			
Laccobius parumpunctatus RÉGIMBART, 1903	*			
Laccobius leucaspis KIESENWETTER, 1870	+	+		Re
Tritonus cribratus (MULSANT, 1844)				Ma*
Agraphydrus albescens (RÉGIMBART, 1903)	+	+		
Agraphydrus praecipuus (ORCHYMONT, 1937)	*			
Agraphydrus punctatellus RÉGIMBART 1903	*			
Helochares bohemani ORCHYMONT, 1936	+	+		
Helochares congruens Orchymont, 1939	+	+		
Helochares crenatostriatus Régimbart, 1903	+	+		Se

Species	Mad	AF	OR	Remarks
Helochares densepunctus Régimbart, 1907	+	+		
Helochares dilutus (Erichson, 1843)	+	+		Ma, Re, Ro
Helochares dollmani Balf.-Browne, 1950	+	+		
Helochares fratris Hebauer, 2003	*			
Helochares interjectus Hebauer, 1998	*			
Helochares longipalpis (Murray, 1859)	+	+		
Helochares madli Hebauer, 2002	*			
Helochares melanophthalmus (Mulsant, 1844)		+		Se
Helochares nigrifrons Brancsik, 1893	+	+		Se
Helochares pallens (MacLeay, 1825)	+	+	+	
Helochares sharpi (Kuwert, 1890)	+	+		
Helochares sechellensis Régimbart, 1903				Se*
Helochares strictus Orchymont, 1939	+	+		
Helochares structus Orchymont, 1936	+	+		
Chasmogenus mauritiensis (Balfour-Br., 1958)	+			Ma
Chasmogenus mollis (Régimbart, 1903)	+			Se
Enochrus anticus (Régimbart, 1905)	+	+		Ro
Enochrus cribrosus (Régimbart, 1903)	*			
Enochrus curtus Balfour-Browne, 1958				Ma*
Enochrus loebli Bameul, 1986	+			Ma
Enochrus longiusculus (Régimbart, 1903)	*			
Enochrus marginicollis (Régimbart, 1903)	*			
Enochrus mauritiensis (Régimbart, 1903)				Ma*
Enochrus natalensis (Gemminger&Harold, 1868)	+	+	+	Ma, Re, Se
Enochrus picinus (Régimbart, 1903)	+	+		
Enochrus regimbarti Zaitzev, 1908	+			Ma
Enochrus rufulus (Régimbart, 1903)	*			
Enochrus seriatus (Régimbart, 1903)	*			
Sternolophus angolensis (Erichson,1843)	+	+		Co, Re, Ro
Sternolophus solieri Castelnau, 1840	+	+		Pal.
Sternolophus unicolor Castelnau, 1840	+	+		
Hydrochara elliptica (Fabricius, 1801)	+	+		
Hydrochara flavipalpis (Boheman, 1851)	+	+		
Hydrochara fulvofemorata (Fairmaire 1869)	+	+		
Hydrobiomorpha cultrifera (Régimbart, 1903)	+			
Cyclotypus heidenfelderi Hebauer, 2002	*			
Cyclotypus tinctus Hebauer, 2002	*			
Hydrophilus aculeatus (Solier, 1834)	+	+		Ma, Re, Pal.
Hydrophilus cavicrus (Kuwert, 1893)	*			
Coelostoma hirsutum Mouchamps, 1958	*			
Coelostoma homalinum Hebauer, 2002	*			
Coelostoma horni (Régimbart, 1903)		+	+	Ma, Re
Coelostoma insolitum Orchymont, 1936	*			
Coelostoma lemuriense Mouchamps, 1958	*			
Coelostoma phalacroides Rég., 1903	*			
Coelostoma punctulatum (Klug, 1833)	*			
Coelostoma rufitarse (Boheman, 1851)	+	+		
Coelostoma rusticum Mouchamps, 1958	+			Se
Coelostoma stultum (Walker, 1858)		+	+	Ma
Dactylosternum abdominale (Fabricius, 1792)	+	+	+	Co,Ma,Re, Ro, Se
Dactylosternum cassidiforme (Brullé, 1835)	*			
Dactylosternum depressum (Klug, 1833)	*			
Dactylosternum diaperinum (Klug, 1833)	*			
Dactylosternum pygmaeum Régimbart, 1903			+	Ma, Se
Dactylosternum vinsoni Balfour-Browne, 1954				Ma*
Hemikruia aspericollis Hebauer, 2003	*			
Protosternum atomarium Sharp, 1890			+	Ma
Acaryon vittatus Hebauer, 2003	*			
Cercyon conjiciens (Walker, 1858)			+	Se
Cercyon crenatostriatus Régimbart, 1903				Ma*

Species	Mad	AF	OR	Remarks
Cercyon decemstriatus ORCHYMONT, 1937	*			
Cercyon dieganus RÉGIMBART, 1903	+	+		
Cercyon fructicola SCOTT, 1913	+			Ma, Re, Se
Cercyon fuscostriatus FAIRMAIRE, 1898	*			
Cercyon grandis CASTELNAU, 1840	*			
Cercyon hova RÉGIMBART, 1903	+	+		Ma, Re, Se
Cercyon inquinatus WOLLASTON, 1854		+	+	Ma, Pal, NA
Cercyon laticollis RÉGIMBART, 1903	+	+		
Cercyon lineolatus (MOTSCHULSKY, 1863)			+	Ma, Re
Cercyon luteopictus BALFOUR-BROWNE, 1954				Re*
Cercyon luteus ORCHYMONT, 1942	+	+		
Cercyon nigerrimus RÉGIMBART, 1903				Ma*
Cercyon nigriceps (MARSHAM, 1802)	+	+	+	Ma, Re, Ro, Se
Cercyon obconicus RÉGIMBART, 1903	*			
Cercyon oosternoides KNISCH. 1922	+	+		
Cercyon pleuralis HEBAUER, 2003	*			
Cercyon procerus RÉGIMBART, 1903	*			
Cercyon putricola WOLLASTON, 1867	+	+		Pal.
Cercyon pyriformis BALFOUR-BROWNE, 1958				Ma, Re
Cercyon ruber HEBAUER, 2003	*			
Cercyon subrufus ORCHYMONT, 1937	*			
Bourdonnaisia mahensis SCOTT, 1913				Se*
Bourdonnaisia silhouettae SCOTT, 1913				Se*
Paromicrus atomus SCOTT, 1913				Se*
Paromicrus carinatus SCOTT, 1913				Se*
Paromicrus thomasseti SCOTT, 1913				Se*
Psalitrus vinsoni BALFOR-BROWNE, 1958				Ma*
Omicrogiton insularis ORCHYMONT, 1919		+	+	Re
Omicrogiton gomyi BAMEUL, 1986				Re*
Noteropagus occlusus ORCHYMONT, 1932	+		+	Ma, Re
Colerus fascicularis HANSEN, 1999	*			
Paroosternum degayanum SCOTT, 1913			+	Se
Pachysternum capense (MULSANT, 1844)		+		Ma
Cryptopleurum florae BAMEUL, 1987	*			
Sphaeridium chrysomelinum KLUG, 1833	*			
HYDROCHIDAE				
Hydrochus costulatus FAIRMAIRE, 1898	*			
Hydrochus metallicus FAIRMAIRE, 1898	*			
Hydrochus shivaroi MAKHAN, 2004	*			
Hydrochus soemintrae MAKHAN, 2004	*			
Hydrochus tenuis FAIRMAIRE, 1903	*			
SPERCHEIDAE				
Spercheus cerisyi GUÉRIN MENEVILLE, 1842	+	+		
Spercheus hovanus FAIRMAIRE, 1903	*			
Spercheus senegalensis CASTELNAU, 1832	+	+		
GEORISSIDAE				
Georissus acutecostatus FAIRMAIRE, 1998	*			
Georissus aequatus DELÉVE, 1967	*			
Georissus alluaudi DELÉVE, 1967	*			
Georissus assimilis DELÉVE, 1967	*			
Georissus bartolozzi CALAM.&MASCAGNI, 1993	*			
Georissus congressarius DELÉVE, 1967	*			
Georissus crenulipennis FAIRMAIRE, 1897	*			
Georissus fairmairei ALLUAUD, 1902	*			
Georissus perrieri ALLUAUD, 1902	*			
Georissus purpurascens FAIRMAIRE, 1905	*			
Georissus taitii CALAMANDREI&MASCAGNI, 1993	*			
Georissus tubericollis FAIRMAIRE, 1898	*			
Georissus tuberifer GROUVELLE, 1909	*			
Georissus vadoni DELÉVE, 1967	*			

PHILIPPINES- HYDROPHILOIDEA (updated: 2005)
(* = endemic)

Species	OR	AU	Remarks
SPERCHEIDAE			
Spercheus stangli SCHWARZ & BARBER, 1918	+		
HYDROCHIDAE			
Hydrochus harrydeepaki MAKHAN, 1994	+		
HYDROPHILIDAE			
Berosus elongatulus philippensis SCHÖDL, `92	*		
Berosus fairmairei ZAITZEV, 1908	+	+	
Berosus pulchellus MCLEAY, 1825	+	+	PA
Regimbartia attenuata (FABRICIUS, 1801)	+	+	+
Chaetarthria indica ORCHYMONT, 1920	+		
Amphiops sp.			
Paracymus orientalis ORCHYMONT, 1925	+		
Paracymus atomus ORCHYMONT, 1925	+		
Pelthydrus boholernsis SCHÖNMANN, 1994	*		
Pelthydrus minutus ORCHYMONT, 1919	+		
Pelthydrus natifer SCHÖNMANN, 1995	*		
Pelthydrus philippinensis SCHÖNMANN, 1995	*		
Pelthydrus zetteli SCHÖNMANN, 1995	*		
Laccobius insularis GENTILI, 1979	*		
Laccobius luzonensis GENTILI, 1989	*		
Laccobius mainiticus GENTILI, 2005	*		
Laccobius orthoscelidis GENTILI, 1979	*		
Laccobius philipinus GENTILI, 2005	*		
Laccobius platescens GENTILI, 1989	*		
Laccobius receptus GENTILI, 1989	*		
Laccobius roseiceps RÉGIMBART, *1903*	+	+	*PA*
Laccobius schoedli GENTILI, 1986	*		
Laccobius sulawesicus GENTILI, 1988	+		
Agraphydrus coomani (ORCHYMONT, 1927)	+	+	
Helochares anchoralis SHARP, 1890	+	+	
Helochares crenatus RÉGIMBART, 1903	+		
Helochares insolitus ORCHYMONT, 1925	*		
Helochares lepidus ORCHYMONT, 1949	*		
Helochares leptinus ORCHYMONT, 1943	+		
Helochares letus ORCHYMONT, 1943	*		
Helochares pallens (MACLEAY, 1825)	+	+	+
Helochares "taprobanicus" SHARP 1890	+	+	1)
Chasmogenus sp.			2)
Enochrella aberrans HANSEN, 1999	*		
Enochrella dubia HEBAUER, 2002	*		
Enochrella viscalis HEBAUER, 2002	*		
Enochrus esuriens (WALKER, 1858)	+	+	PA, Pac.
Enochrus fallax ORCHYMONT, 1925	*		
Enochrus fragiloides ORCHYMONT, 1925	*		
Enochrus malabarensis (RÉGIMBART, 1903)	+	+	
Enochrus nigropiceus (MOTSCHULSKY, 1861)	+		3)
?Enochrus tetraspilus (RÉGIMBART, 1903)	+		
Sternolophus inconspicuus (NIETNER, 1856)	+		PA
Sternolophus rufipes (FABRICIUS, 1792)	+		PA
Hydrobiomorpha spinicollis philippensis, MOUCHAMPS, 1959	*		
Hydrophilus bilineatus (MACLEAY, 1825)	+	+	?PA
Coelostoma lazarense ORCHYMONT, 1925	+		
Coelostoma stultum (WALKER, 1858)	+		AF
Coelofletium exstriatum ORCHYMONT, 1925	+		Pac.
Dactylosternum corbetti BALFOUR-BR., 1942	+		
Dactylosternum abdominale (FABRICIUS, 1792)			cosm.
Dactylosternum dytiscoides (FABRICIUS, 1775)	+	+	Pac.
Dactyl. hydrophiloides (MACLEAY, 1825)	+	+	AF
Dactylosternum pygmaeum RÉGIMBART,1903	+		AF

Species	Mad	AF	OR	Remarks
Rhombosternum consobrinum BAMEUL, 1997		+		
Omicrogiton insularis ORCHYMONT, 1919		+		AFl
Noterpagus occlusus ORCHYMONT, 1932		+		AF
Noteropagus politus ORCHYMONT, 1919		+		
Armostus babrius ORCHYMONT, 1942		*		
Armostus bakeri KNISCH, 1927		*		
Armostus schenklingi ORCHYMONT, 1914		+		
Australocyon impressicollis HANSEN, 2003		*		
Pilocnema philippinensis HANSEN, 2002		*		
Peltocercyon coomani ORCHYMONT, 1925		+		
Cercyon haemorrhoidalis (FABRICIUS, 1775)				PA, introd.
Cercyon lazarensus ORCHYMONT, 1925		*		
Cercyon lineolatus (MOTSCHULSKY, 1863)		+		AF
Cercyon lunulatus GEMM.&HAROLD, 1868		+		
Cercyon luzonensis KNISCH, 1926		*		
Cercyon nigriceps (MARSHAM, 1802)		+	+	cosmopol.
Cercyon punctiger KNISCH, 1921		+		
Cercyon secretus ORCHYMONT, 1925		*		
Cercyon subsolanus BALF.-BROWNE, 1939		+		
?Pelosoma sumatrense ORCHYMONT, 1932		+		
Paroosternum leytense HEBAUER, 2002		*		
Bulbonotum nigrum HANSEN, 1999		*		
Pacrillum insulare ORCHYMONT, 1941		*		
Pachysternum curvatum ORCHYMONT, 1925		*		
?Sphaeridium dimidiatum GORY, 1834		+		
Sphaeridium discolor ORCHYMONT, 1933		+	+	
Sphaeridium quinquemaculatum F., 1798		+		PA.
Sphaeridium seriatum ORCHYMONT, 1913		+		

Remarks: AF = Afrotropical, PA = Palaearctic, Pac. = pacific,
1) = ?*atropiceus* RÉG. 1903; 2) = not "*livornicus*"!; 3) = *rubrocinctus* RÉG., 1903.

TAIWAN- HYDROPHILIDAE (updated: 2005)
* = endemic

Species	end	OR	PA	Remarks
Hydrocassis taiwana SATÔ, 1971	*			
Berosus elongatulus JORDAN, 1894		+	+	AF
Berosus fairmairei ZAITZEV, 1908		+	+	
Berosus incretus ORCHYMONT, 1937		+	+	
Berosus japonicus SHARP, 1873		+	+	
Berosus pulchellus MACLEAY, 1825		+	+	AF, AU
Berosus punctipennis HAROLD, 1878		+	+	
Regimbartia attenuata (FABRICIUS, 1801)		+	+	AF, AU
Paracymus atomus ORCHYMONT, 1926		+		
Paracymus orientalis ORCHYMONT, 1926		+	+	
Crenitis formosana HEBAUER, 1994	*			
Crenitis osawai NAKANE, 1966		+	+	
Crenitis satoi HEBAUER, 1994		+	+	
Anacaena hunanensis PU, 1963		+		
Pelthydrus jengi SCHÖNMANN, 1995	*			
Pelthydrus minutus ORCHYMONT, 1919		+		
Pelthydrus vitalisi ORCHYMONT, 1926		+		
Laccobius flaveolus HEBAUER & WANG, 1998	*			
Laccobius formosus GENTILI, 1979		+	+	
Laccobius hammondi GENTILI,1984		+	+	
Laccobius inermis GENTILI, 1995		+		
Laccobius inopinus GENTILI,1980		+	+	
Laccobius politus GENTILI,1979	*			
Oocyclus bhutanicus SATÔ, 1979		+		
Oocyclus magnificus HEBAUER & WANG, 1998	*			
Agraphydrus narusei SATÔ, 1960		+	+	

Species	end	OR	PA	Remarks
Agraphydrus orientalis (Orchymont,1932)		+		
Agraphydrus ryukyuensis (Matsui, 1994)		+		
Megagraphydrus politus Hansen, 1999	*			
Megagraphydrus wangi Hebauer, 2000	*			
Helochares anchoralis Sharp, 1890		+	+	
Helochares lentus Sharp, 1890		+	+	
Helochares sauteri Orchymont, 1943	*			
Chasmogenus abnormalis (Sharp, 1890)		+	+	
Enochrus esuriens (Walker, 1858)		+	+	AU, Pacific
Enochrus flavicans (Régimbart, 1903)		+	+	
Enochrus fragilis (Sharp, 1890)		+		
Enochrus parumstriatus Hebauer, 2005	*			
Enochrus sauteri Orchymont, 1913	*			
Enochrus simulans (Sharp, 1873)		+	+	
Enochrus subsignatus (Harold, 1877)			+	
Sternolophus inconspicuus Nietner, 1857		+	+	
Sternolophus rufipes (Fabricius, 1792)		+	+	
Hydrophilus acuminatus Motschulsky, 1853		+	+	
Hydrophilus bilineatus MacLeay, 1825		+	?	AU
Hydrophilus bilin. caschmirensis Redtenb. 1844		+	+	
Coelostoma stultum (Walker, 1858)		+	+	AF
Dactylosternum abdominale (Fabricius, 1792)		+	+	cosmopol.
Dactylosternum hydrophiloides (MacLeay, 1825)		+	+	AF, AU, NT
Protosternum abnormale (Orchymont, 1913)		+		
Psalitrus sauteri Orchymont, 1929	*			
Peratogonus reversus Sharp, 1884		+	+	
Armostus schenklingi (Orchymont, 1914)		+		
Cercyon conjiciens (Walker, 1858)		+		
Cercyon laminatus Sharp, 1873			+	
Cercyon lunulatus Gemminger & Harold, 1868		+		
Cercyon nigriceps (Marsham, 1802)		+	+	cosmopol.
Cercyon subsolanus Balfour-Browne, 1939		+	?	Saudi Arab.
Cercyon ustus Sharp, 1874		+	+	
Oosternum sorex (Sharp, 1874)		+	+	Pacific
Emmidolium excavatum Orchymont, 1937		+		AF
Paroosternum saundersi (Orchymont, 1925)		+		
Cryptopleurum ferrugineum Motschulsky, 1863		+	+	
Cryptopleurum pygmaeum Orchymont, 1913		+		
Cryptopleurum subtile Sharp, 1884		+	+	NA
Sphaeridium dimidiatum Gory, 1834		+	+	
Sphaeridium discolor Orchymont, 1933		+		AU
Sphaeridium quinquemaculatum Fabricius, 1798		+	+	
Sphaeridium reticulatum Orchymont, 1929		+		
Sphaeridium seriatum Orchymont, 1913		+		

SRI LANKA - Hydrophiloidea (updated: 2005)
(= endemic; AF = Afrotropical; OR = Oriental; cos. = cosmopolitan)

Species	end.	OR	AF	Remarks
GEORISSIDAE				
Georissus gemma Nietner, 1856	*			
HYDROCHIDAE				
Hydrochus lacustris Nietner, 1856		+		
SPERCHEIDAE				
Spercheus hanseni Hebauer, 1990		+		
Spercheus stangli Schwarz&Barber, 1918		+		
EPIMETOPIDAE				
Eumetopus flavidulus (Sharp, 1890		+		
HYDROPHILIDAE				
Berosus elongatulus Jordan, 1894		+		
Berosus ineditus Orchymont, 1937		+		
Berosus nigriceps (Fabricius, 1801)		+		

Species	Mad	AF	OR	Remarks
Berosus pulchellus MACLEAY, 1825		+		
Berosus indicus (MOTSCHULSKY, 1861)		+		
Regimbartia attenuata (FABRICIUS, 1801)		+		
Allocotocerus leachi (HOPE, 1838)		+		
Thysanarthria brincki HEBAUER, 2001	*			
Thysanarthria ceylonensis HEBAUER, 2001	*			
Thysanarthria madurensis HEBAUER, 2001	*			
Amphiops gibbus (ILLIGER, 1801)		+		
Amphiops mirabilis SHARP, 1890		+		
Amphiops mater pedestris SHARP, 1890		+		
Amphiiops simplex SHARP. 1890	*			
Paracymus evanescens (SHARP, 1890)		+		
Paracymus vulgatus WOOLDRIDGE, 1977		+		
Paracymus ?orientalis ORCHYMONT, 1925		+		
Anacaena advena (SHARP, 1890)		+		
Anacaena minima (SHARP 1890)	*			
Notionotus siklisi HEBAUER, 2001		+		
Pelthydrus jaechi SCHÖNMANN, 1994	*			
Pelthydrus suffacinatus SCHÖNMANN, 1995	*			
Laccobius rectus SHARP, 1890	*			
Laccobius discicollis RÉGIMBART, 1903		+		
Scoliopsis spinosa ORCHYMONT, 1919	*			
Oocyclus armatus HEBAUER&WANG, 1998	*			
Oocyclus latus ORCHYMONT, 1919		+		
Oocyclus coxalis HEBAUER&WANG, 1998	*			
Megagraphydrus uvaensis HEBAUER, 2000	*			
Helochares pallens (MACLEAY, 1825)		+		
Helochares taprobanicus SHARP, 1890		+		
Helochares anchoralis SHARP, 1890		+		
Helochares cancellatus HEBAUER, 1998	*			
Helochares densus SHARP, 1890		+		
Helochares lentus SHARP, 1890		+		
Chasmogenus abnormalis (SHARP, 1890)		+		
Enochrus esuriens (WALKER, 1858)		+		
Enochrus fragilis (SHARP, 1890)		+		
Enochrus fuscatus (MOTSCHULSKY, 1861)		+		
Enochrus iteratus (SHARP, 1890)		+		
Enochrus malabarensis (RÉGIMBART, 1903)		+		
Enochrus natalensis (GEMM.&HAROLD, 1868)			+	
Enochrus nigropiceus (MOTSCHULSKY, 1861)		+		
Sternolophus inconspicuus (NIETNER, 1856)		+		
Sternolophus rufipes (FABRICIUS, 1892)		+		
Hydrobiomorpha rufiventris (NIETNER, 1856)		+		
Hydrobiomorpha spinicollis (ESCHSCH., 1822)		+		
Hydrophilus bilineat. caschmirensis REDT.,1844		+		
Hydrophilus olivaceus FABRICIUS, 1781		+		
Coelostoma horni (RÉGIMBART,1902)		+	+	
Coelostoma stultum (WALKER, 1858)		+	+	
Coelostoma bibilense HEBAUER, 2000	*			
Dactylosternum abdominale (FABRICIUS, 1792)				cos.
Dactylosternum dytiscoides (FABRISIUS, 1775)		+		
Dactylosternum lanipes HEBAUER, 2000	*			
Protosternum atomarium SHARP, 1890		+		
Protosternum newtoni BAMEUL, 1997	*			
Nannomicrus pulchellus BAMEUL, 1991	*			
Psalitrus loebli BAMEUL, 1992	*			
Psalitrus mahanuwara BAMEUL, 1992	*			
Psalitrus nigritulus (MOTSCHULSKY, 1866)	*			
Psalitrus veddha BAMEUL, 1992	*			
Omicrogiton insularis ORCHYMONT, 1919		+		

Species	Mad	AF	OR	Remarks
Armostus optatus SHARP, 1890		+		
Morastus gracilipalpis ORCHYMONT, 1926		+		
Peltocercyon lunulatus (GEMM.&HAROLD,1868		+		
Cercyon aviarius KNISCH, 1927	*			
Cercyon conjiciens (WALKER, 1858)		+		
Cercyon? hydrophiloides MOTSCHULSKY, 1863		+		
Cercyon lineolatus MOTSCHULSKY, 1863		+		
Cercyon nigriceps (MARSHAM, 1802)				cos.
Cercyon pilosellus HEBAUER, 2000	*			
Cercyon punctiger KNISCH, 1921		+		
Cercyon? rufotestaceus MOTSCHULSKY, 1863	*			
Cercyon subsolanus BALFOUR-BROWNE, 1939		+		
Oosternum sharpi HANSEN, 1999		+		
Paroosternum sorex (SHARP, 1874)		+		
Pachysternum nigrovittatum MOTSCH., 1863		+		
Cryptopleurum ferrugineum MOTSCHULSKY, 1863		+		
Cryptopleurum sulcatum MOTSCHULSKY, 1863		+		
Sphaeridium dimidiatum GORY, 1834		+		
Sphaeridium quinquemaculatum F., 1798		+		

Fig. 3: Geographical distribution of **1:** HELOPHORIDAE (*Helophorus*),
(Fig. 1 and 2 see p. 56)

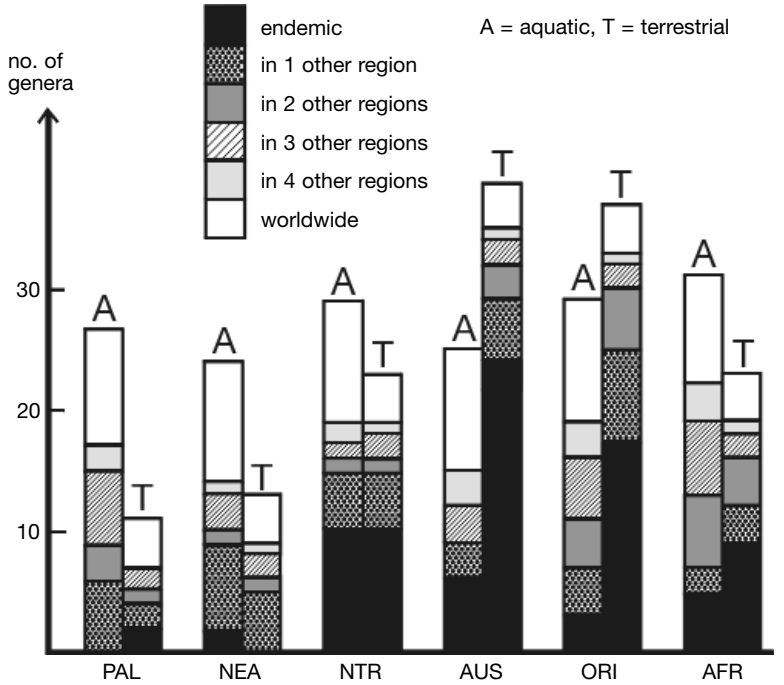

Fig. 1: Hydrophiloid genera - Degree of endemism 1

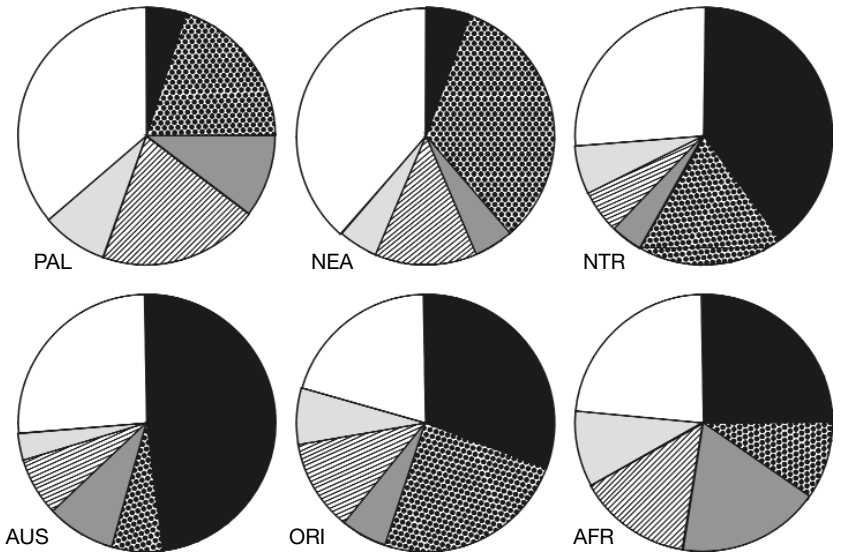

Fig. 2: Hydrophiloid genera - Degree of endemism 2
(pattern concerning to Fig. 1)
(Fig. 3 see p. 55)

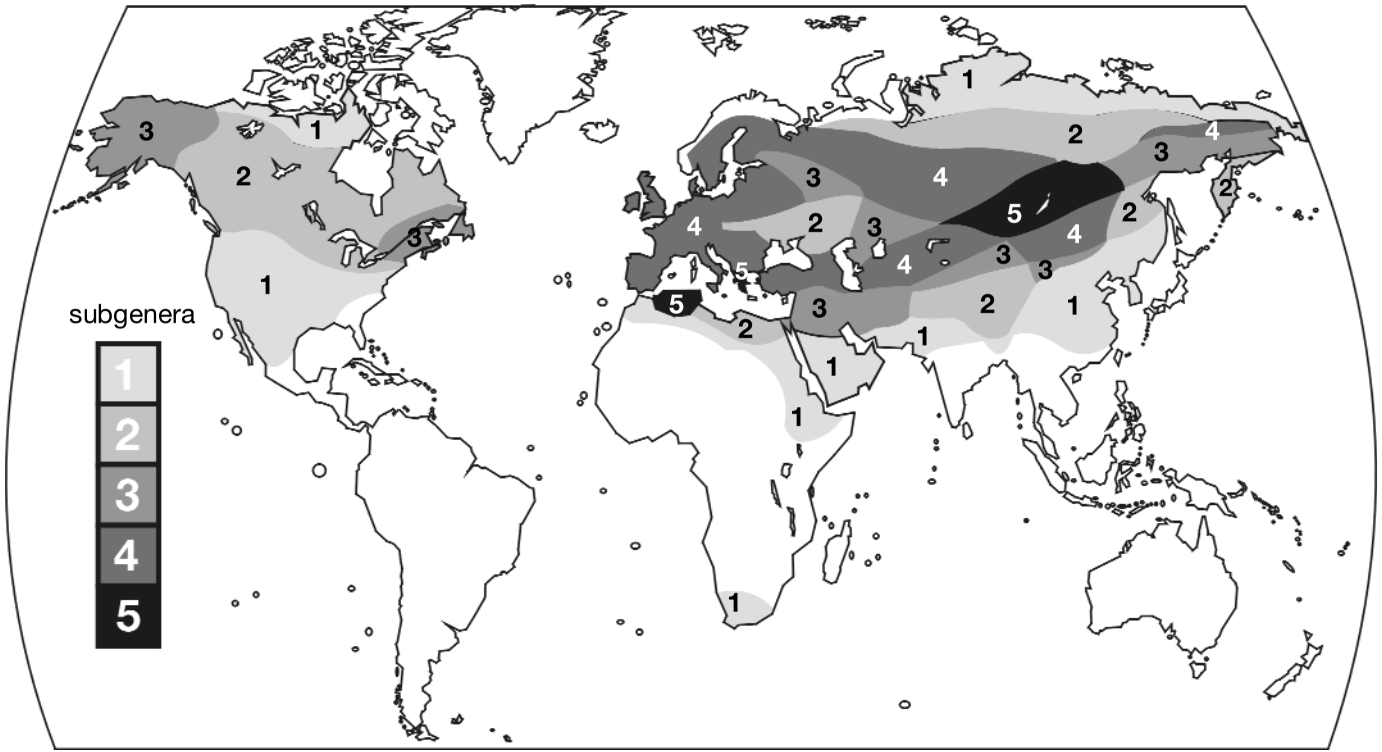

Fig. 4: Geographical distribution of HELOPHORIDAE (*Helophorus*, subgenera)
1: *Rhopalhelophorus*;
2: *Kyphohelophorus* + *Eutrichelophorus* + *Lihelophorus* [+ *Thaumhelophorus*: India-Assam];
3: Helophorus s.str. [+*Gephelophorus*: Alaska, China, Scandinavia; + *Orphelophorus*: Canada, China, East Siberia;
+ *Trichohelophorus*: southern and western Europe];
4: *Empleurus*:
5: *Transithelophorus.*

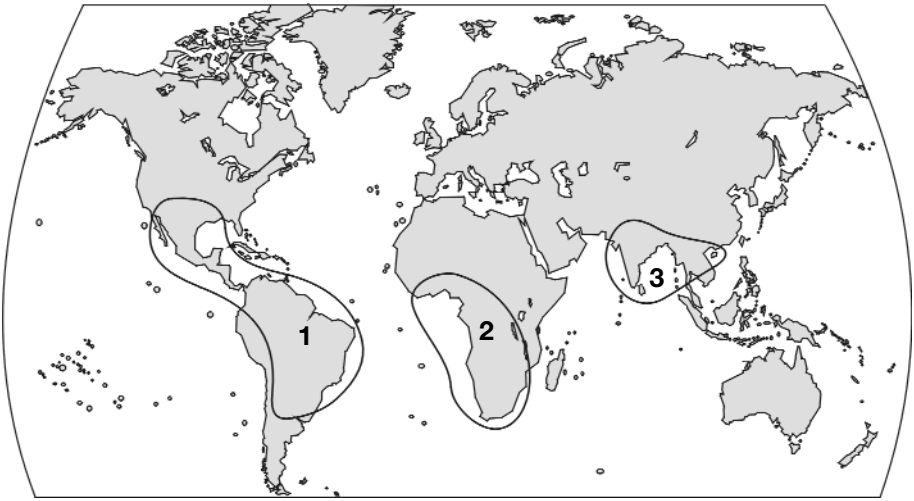

Fig. 5: Geographical distribution of EPIMETOPIDAE (subgenera)
1: *Epimetopus*,
2: *Eupotemus*,
3: *Eumetopus*

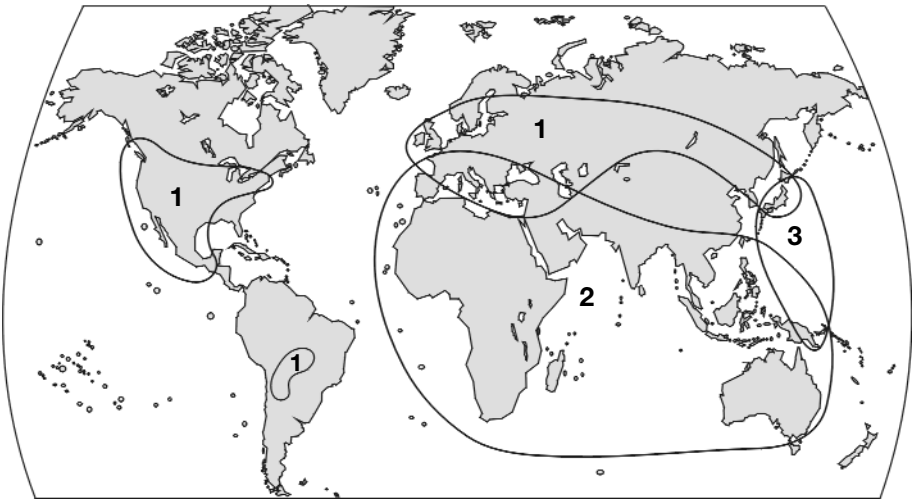

Fig. 6: Geographical distribution of GEORISSIDAE (subgenera)
1: *Georissus* s. str., **2**: *Neogeorissus*, **3**: *Nipponogeorissus*

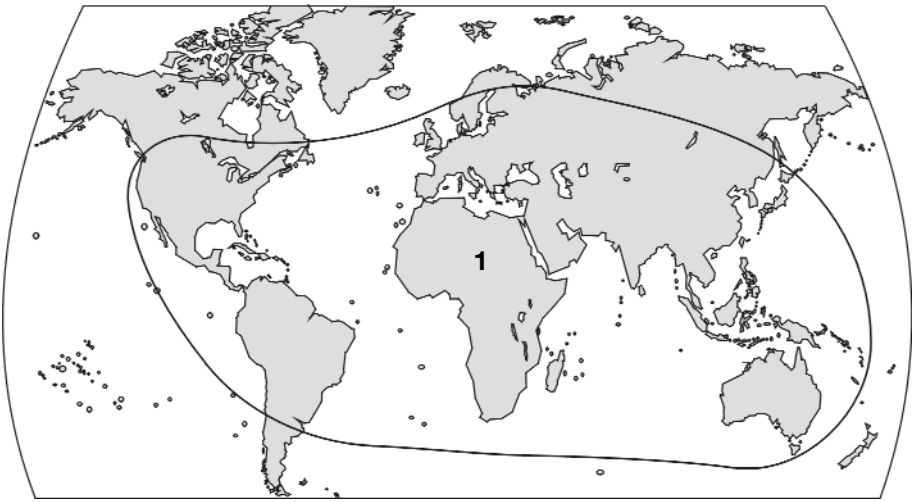

Fig. 7: Geographical distribution of HYDROCHIDAE
1: (*Hydrochus*)

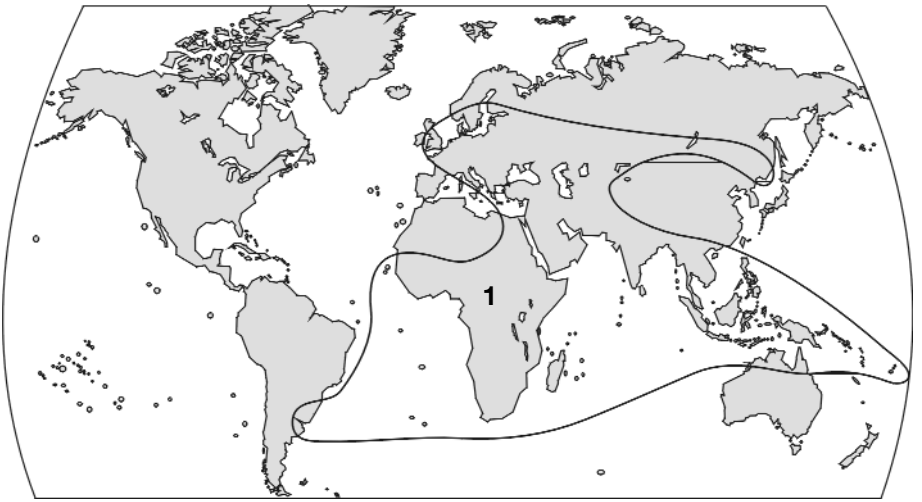

Fig. 8: Geographical distribution of SPERCHEIDAE
1: (*Spercheus*)

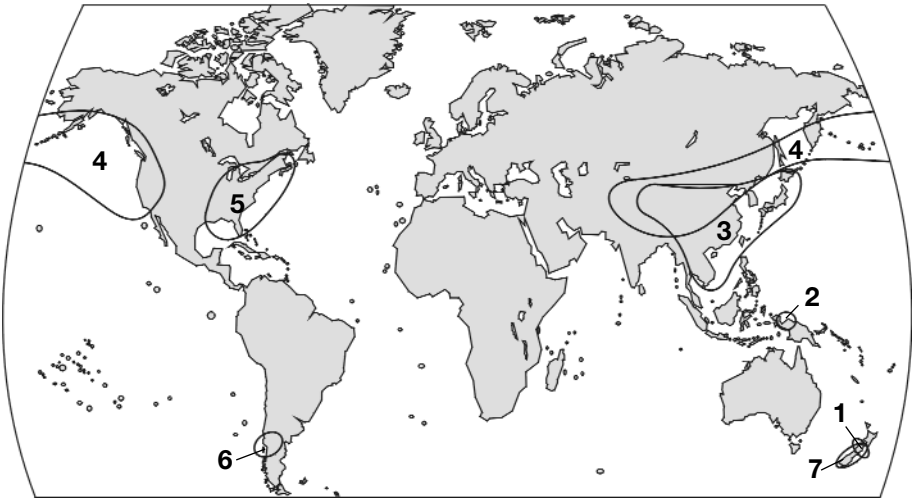

Fig. 9: Geographical distribution of HYDROPHILIDAE:
HORELOPHINAE **1**: (*Horelophus*),
HORELOPHOPSINAE **2:** (*Horelophopsis*),
HYDROPHILINAE - Sperchopsini (**3:** *Hydrocassis,* **4:** *Ametor,* **5:** *Sperchopsis,* **6:** *Anticura*, and **7:** *Cylomissus*)

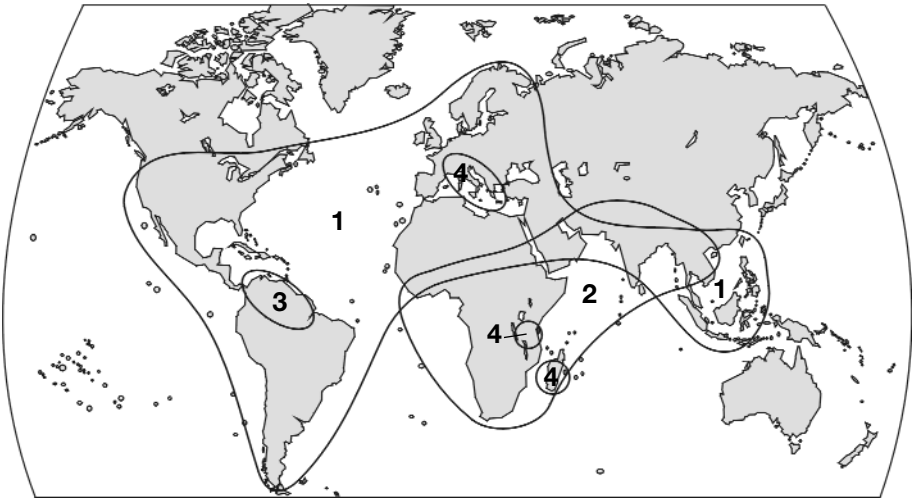

Fig. 10: Geographical distribution of HYDROPHILIDAE - Chaetarthriini I.
(**1:** *Chaetarthria*, **2:** *Thysanarthria,* **3:** *Apurebium and Venezuelobium,* **4:** *Hemisphaera)*

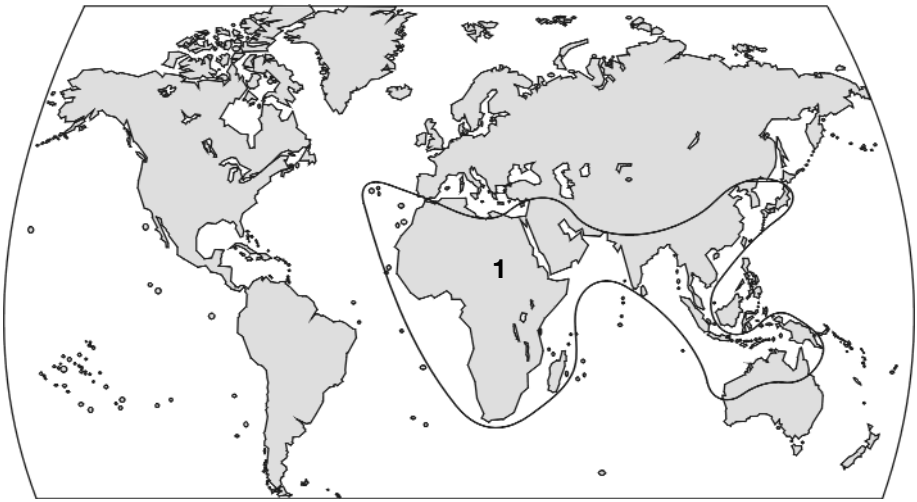

Fig. 11: Geographical distribution of HYDROPHILIDAE - Chaetarthriini II.
(1: *Amphiops*)

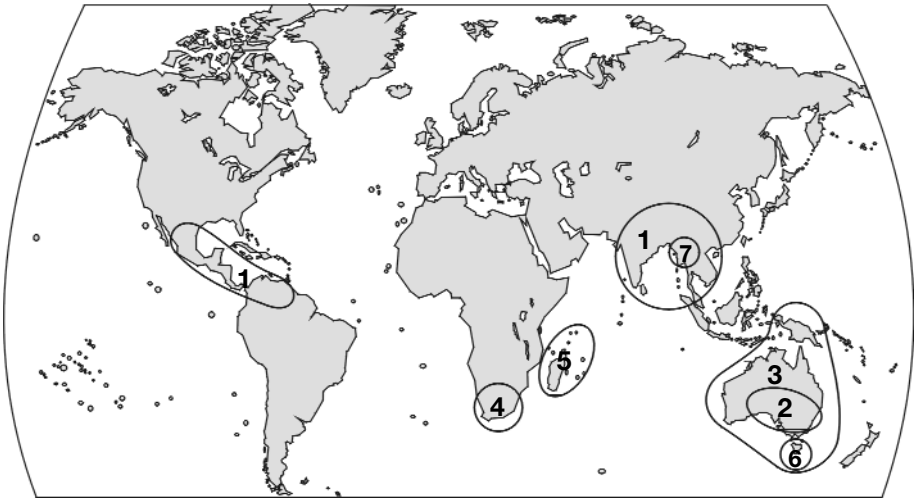

Fig. 12: Geographical distribution of HYDROPHILIDAE - Anacaenini
(**1:** *Notionotus,* **2:** *Notohydrus,* **3:** *Paranacaena,* **4:** *Grodum,* **5:** *Enigmata,* **6:** *Phelea,* **7:** *Hebauerina*)

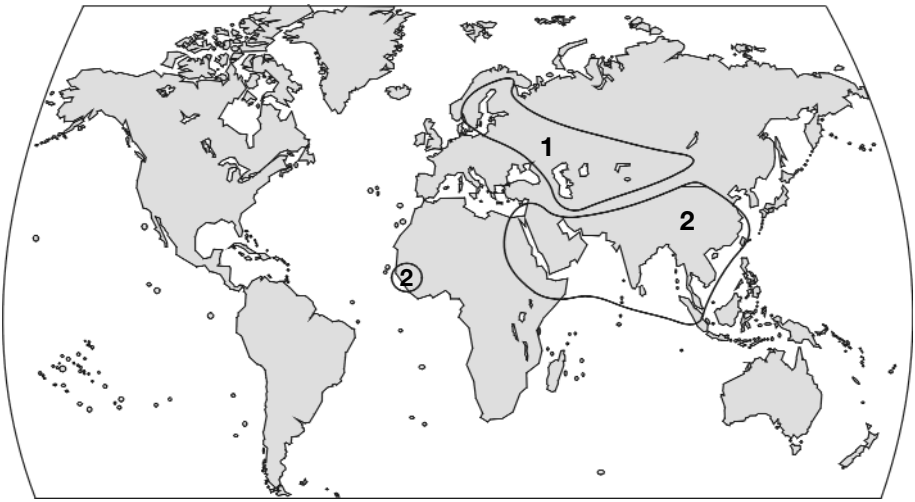

Fig. 13: Geographical distribution of HYDROPHILIDAE - Laccobiini subgenera I.
(**1:** *Compsolaccobius,* **2:** *Cyclolaccobius*)

Fig. 14: Geographical distribution of HYDROPHILIDAE - Laccobiini subgenera II.
(**1:** *Laccobius,* **2:** *Laccobius* subg.?)

Fig. 15: Geographical distribution of HYDROPHILIDAE - Laccobiini subgenera III.
(**1:** *Dimorpholaccobius,* **2:** *Notoberosus,* **3:** *Yateberosus*)

Fig. 16: Geographical distribution of HYDROPHILIDAE - Laccobiini subgenera IV.
(**1:** *Hydroxenus*, **2:** *Glyptolaccobius*)

Fig. 17: Geographical distribution of HYDROPHILIDAE - Laccobiini subgenera V.
(**1:** *Microlaccobius*, **2:** ssp. *melanesiae*)

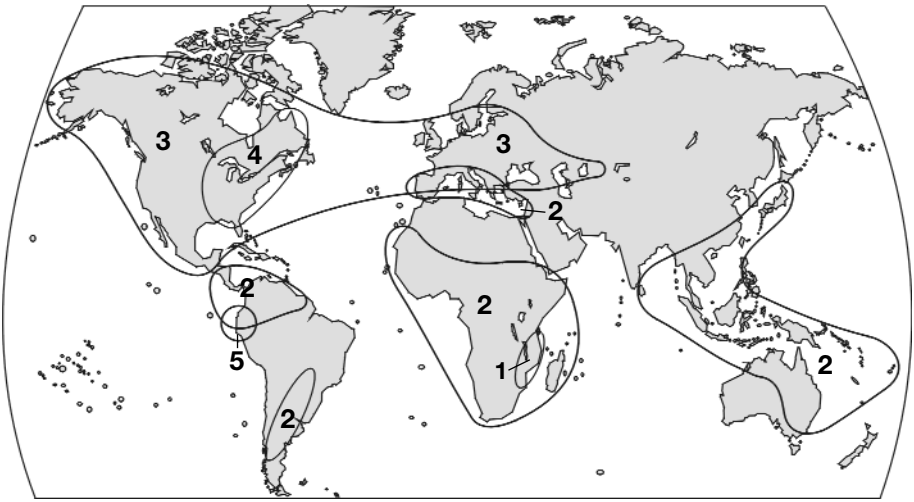

Fig. 18: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Acidocerina I.
(**1:** *Acidocerus*, **2:** *Chasmogenus*, **3:** *Cymbiodyta*, **4:** *Helocombus*, and **5:** *Troglochares*)

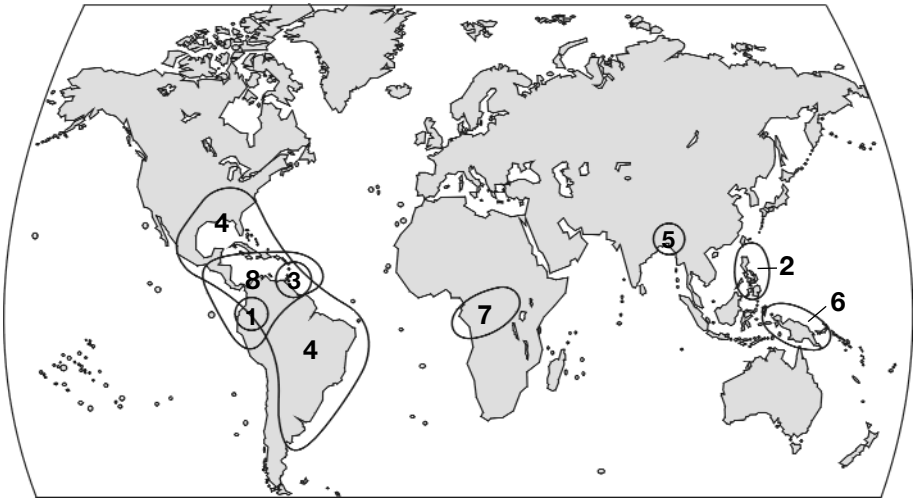

Fig. 19: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Acidocerina II. (**1:** *Dieroxenus,* **2:** *Enochrella,* **3:** *Gemelus,* **4:** *Helobata,* **5:** *Helopeltarium,* **6:** *Omniops,* **7:** *Peltochares*, and **8:** *Quadriops*)

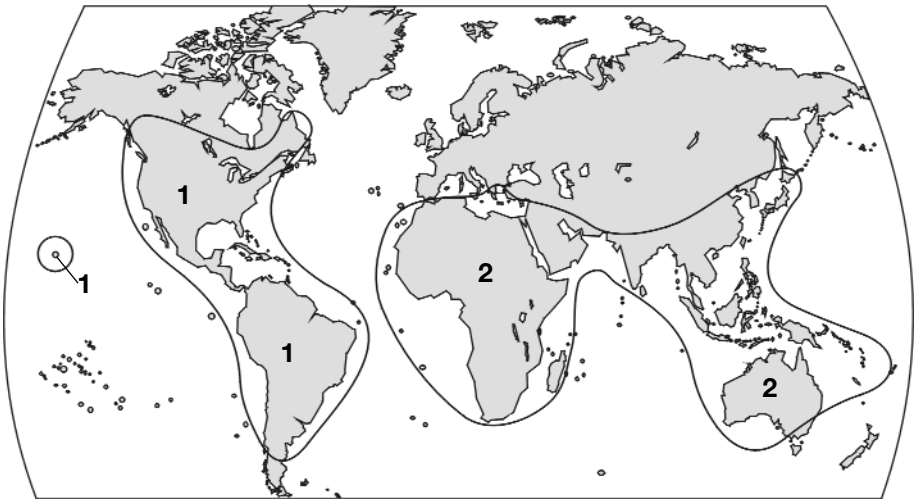

Fig. 23: Geographical distribution of HYDROPHILIDAE - Hydrophilini - Hydrophilina I. (**1:** *Tropisternus*, **2:** *Sternolophus*)

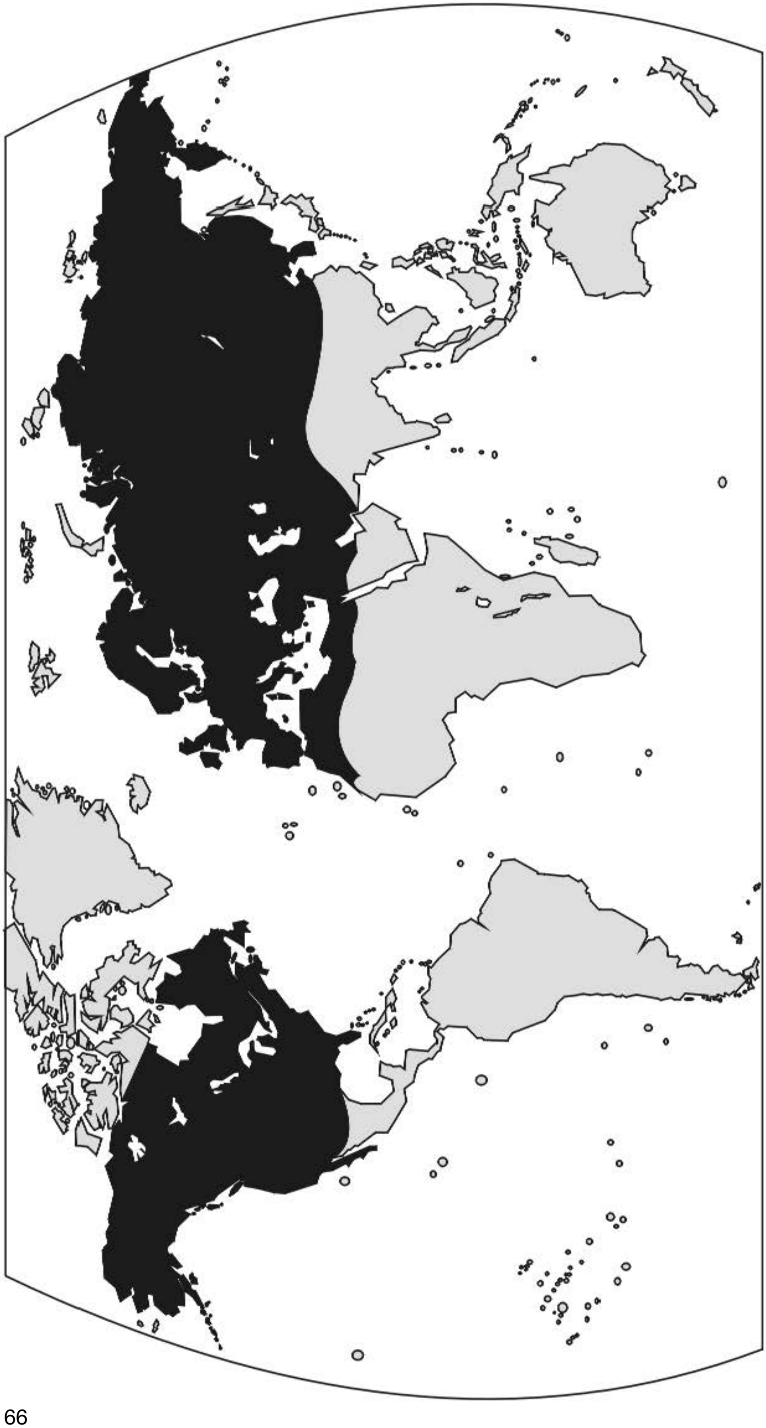

Fig. 20: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Hydrobiusina I. (■ *Hydrobius*)

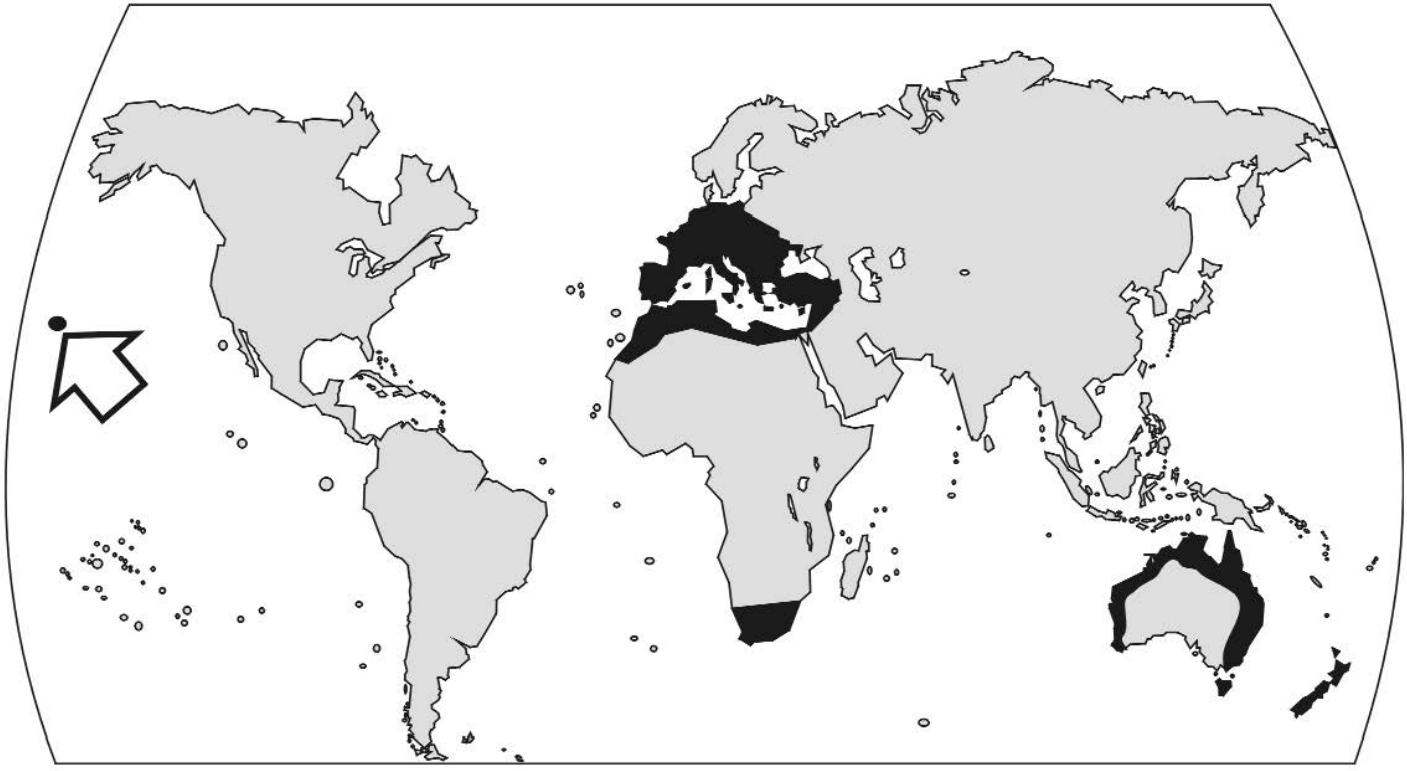

Fig. 21: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Hydrobiusina II.
(■ *Limnoxenus*)

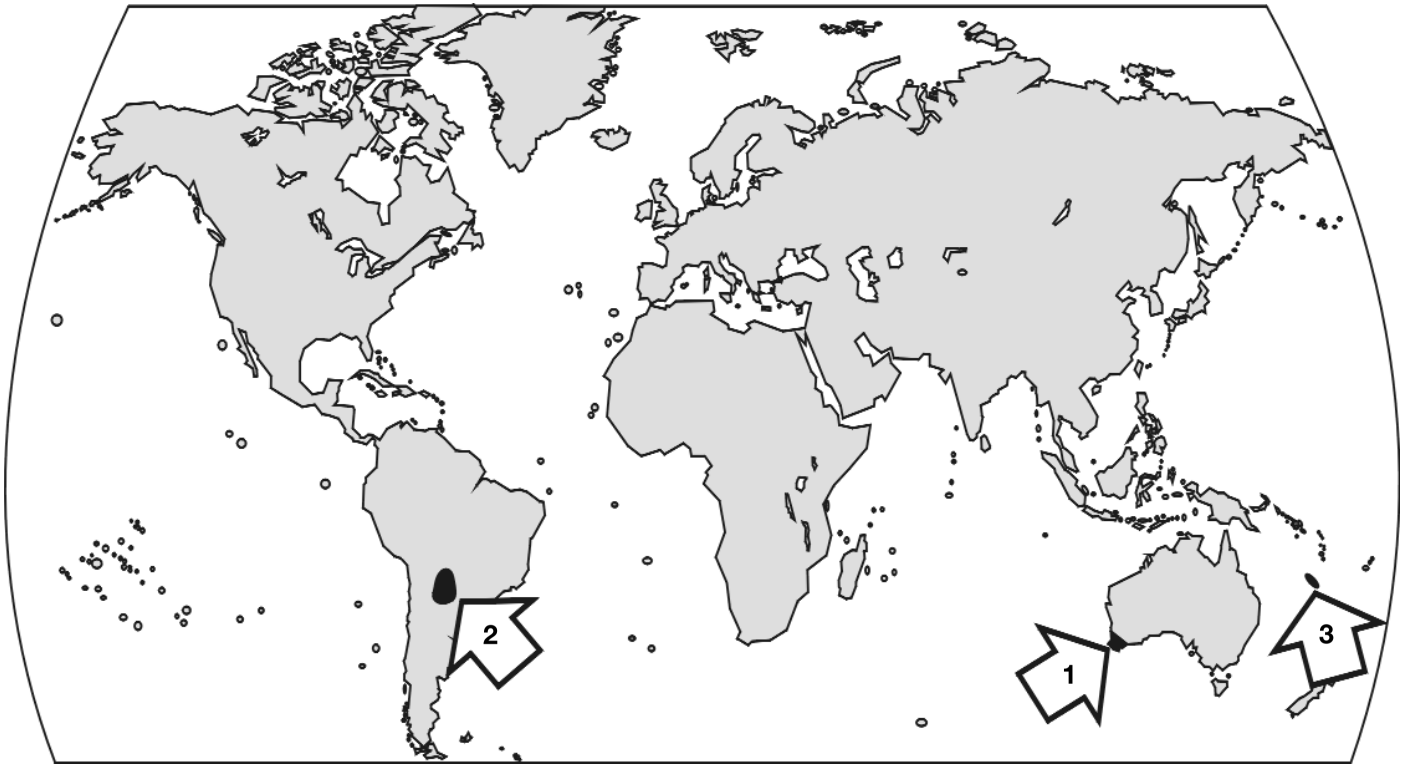

Fig. 22: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Hydrobiusina III.
(**1:** *Hybogralius,* **2:** *Hydramara,* and **3:** *Limnocyclus)*
Fig. 23 see p. 65

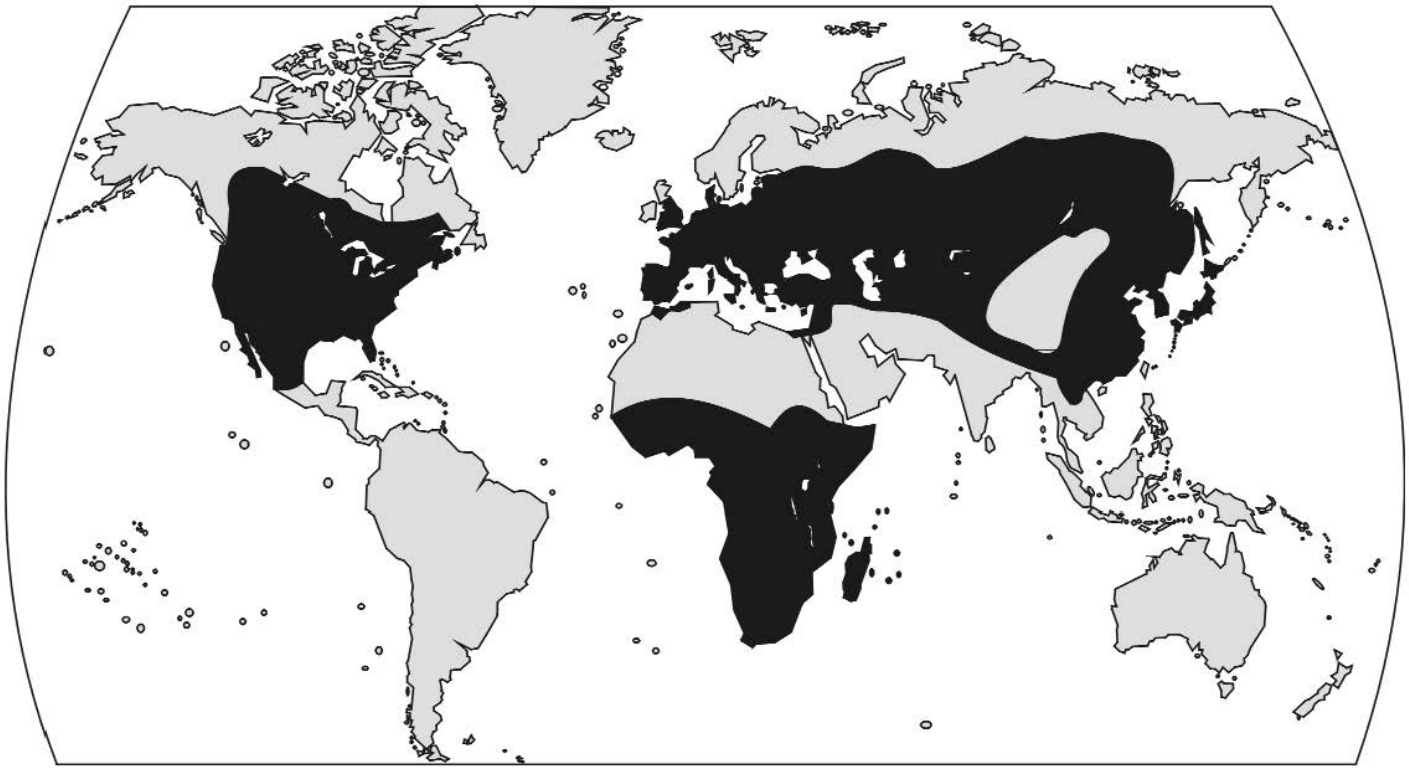

Fig. 24: Geographical distribution of HYDROPHILIDAE - Hydrophilini: Hydrophilina II.
(■ *Hydrochara)*
Fig. 23 see p. 65

Fig. 25: Geographical distribution of HYDROPHILIDAE - SPHAERIDIINAE: Rygmodini (**1:** *Rygmodus and Saphydrus,* ***2:*** *Eurygmodus,* **3:** *Pseudorygmodus,* **4:** *Pseudohydrobius,* **5:** *Rygmostralia,* **6:** *Cylorgymus*)

Fig. 26: Geographical distribution of HYDROPHILIDAE - SPHAERIDIINAE:
Andotypini (**1:** *Andotypus,* **2:** *Coelostomopsis*);
Borborophorini (**3:** *Borborophorus,* **4:** *Petasopsis*);
Tormissini (**5:** *Afrotormus,* **6:** *Tormus, Exydrus and Hydrostygnus,* **7:** *Tormissus*)

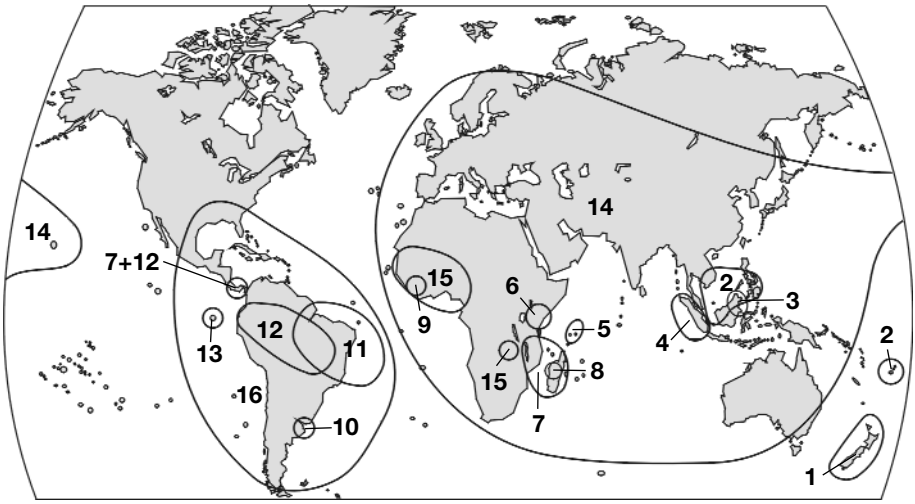

Fig. 27: Geographical distribution of HYDROPHILIDAE - SPHAERIDIINAE: Coelostomatini (**1:** *Cyloma + Adolopus,* **2:** *Coelofletium,* **3:** *Rhachiostethus,* **4:** *Dactylostethus,* **5:** *Bourdonnaisia,* **6:** *Coeloctenus,* **7:** *Cyclotypus,* **8:** *Hemikruia,* **9:** *Kruia,* **10:** *Hydroglobus* **11***: Lachnodacnum,* **12:** *Phaenostoma,* **13:** *Galapagodacnum,* **14:** *Coelostoma,* **15:** *Toma,* **16:** *Phaenonotum*)

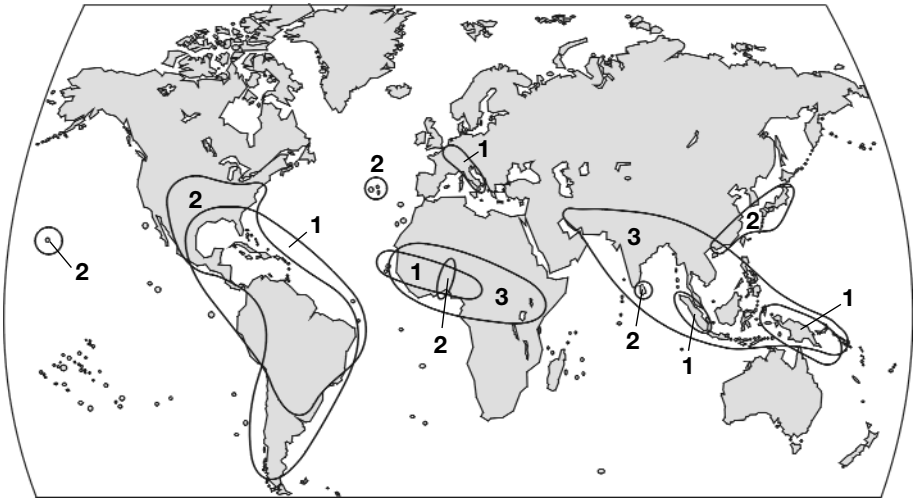

Fig. 28: Geographical distribution of HYDROPHILIDAE - SPHAERIDIINAE: Megasternini (**1:** *Pelosoma*, **2:** *Oosternum*, and **3:** *Paroosternum*).