

HYDROPHILIDAE:

2. Synopsis of *Hydrocassis* DEYROLLE & FAIRMAIRE and *Ametor* SEMENOV, with description of three new species (Coleoptera)

S. SCHÖDL & L. Ji

Abstract

The systematics and taxonomy of the species of the genera *Hydrocassis* DEYROLLE & FAIRMAIRE and *Ametor* SEMENOV are treated. The two genera are treated separately on account of aedeagal differences. Further detailed phylogenetic analyses need to be done to define the relationships of these genera. Nine species are recognized in *Hydrocassis*. They are arranged in three species groups based on aedeagal features. Three new species, all from China (Yunnan), are described: *Hydrocassis baoshanensis* sp.n., *H. metasternalis* sp.n. and *H. schillhameri* sp.n. A neotype is designated for *Hydrocylus imperialis* KNISCH. The four species of the genus *Ametor* are arranged in three species groups. Lectotypes are designated for *Ametor rudesculptus* SEMENOV and *Hydrocylus rugosus* KNISCH. The following new combinations and new synonymies are established: *Hydrocassis scapha* d'ORCHYMONT (= *H. vietnamica* SATÔ syn.n.), *Ametor scabrosus* (HORN) (= *Ametor lucifer* (SHATROVSKIY) syn.n. et comb.n.), *A. rudesculptus* SEMENOV (= *A. oberthuri* d'ORCHYMONT syn.n., = *A. wittmeri* SATÔ syn.n.), *Ametor rugosus* (KNISCH) (= *Ametor rufrenus* (d'ORCHYMONT) syn.n. et comb.n.). The aedeagi of all species are illustrated. A key to the species groups and species of the two genera is provided.

Key words: Coleoptera, Hydrophilidae, *Hydrocassis*, *Ametor*, taxonomy, species groups, new species, new synonymies, new combinations, neotype designation, lectotype designation, eastern Palearctic, China, Nearctic

Introduction

The genus *Hydrocassis* (type species by monotypy: *H. scapulata* DEYROLLE & FAIRMAIRE, 1876 from "Central China") was erected by DEYROLLE & FAIRMAIRE (1876). SHARP (1884) described the genus *Hydrocylus*, the type species of which is *Hydrocylus lacustris* from Japan. D'ORCHYMONT (1928) synonymized the two genera.

The genus *Ametor* (type species by monotypy: *A. rudesculptus* Semenov, 1900 described from Tadzhikistan) was erected by SEMENOV (1900).

Until now, the phylogenetic relationship of *Hydrocassis* and *Ametor* has not been understood.

Material & Methods

This study is based on material collected by the CWBS (deposited in the NMW and CASS) and type material and specimens from additional institutions and private collections (see below).

Specimens were examined with a Wild M5A stereoscopic microscope with direct lighting and a Wild M10 stereoscopic microscope with diffuse lighting. In addition, aedeagi were examined with an Olympus BH-2 microscope with transmitted light.

Aedeagal illustrations were drawn with the aid of a drawing tube. Male genitalia were placed in concentrated lactic acid in a cavity slide for at least several hours before they were examined.

The body length is measured from the front margin of the labrum to the elytral apex. The ratio of elytral length/elytral width (EI) is used as auxiliary means for separating the two treated genera.

Acronyms and CWBS localities

The material used for this study is deposited in the following institutions and private collections (abbreviations are used to refer to collections in the text):

BML	The Natural History Museum, London (S. Hine) [formerly: British Museum (Natural History)]
CASS	Chinese Academy of Sciences, Institute of Applied Ecology, Shenyang
CWBS	China Water Beetle Survey
ISNB	Institut royal des Sciences naturelles de Belgique, Bruxelles (K. Desender, M. Cludts)
MHNH	Museum national d'Histoire Naturelle, Paris (Y. Cambelort)
MNS	Staatliches Museum für Naturkunde, Stuttgart (W. Schawaller)
NMB	Naturhistorisches Museum, Basel (M. Brancucci)
NMW	Naturhistorisches Museum, Wien (H. Schönmann, M.A. Jach)
NTU	Dept. of Plant Pathology & Entomology, National Taiwan University, Taipei (M.-L. Jong, C.-F. Lee)
WUN	Women's University, Nagoya (M. Satō)
ZMHH	Zoologisches Museum der Universität Hamburg (R. Abraham)
ZMH	Eilämnusko (Zoologiska museet), Helsingfors (H. Silfverberg)

CWBS loc. 20: **Human Province**; Xiangxi Prefecture; Dayong County; Zhangjiajie Forest National Park, Suoxiyü Nature Reserve, Wulingyuan section (ca. 30 km N Dayong City); Pipa Xi ('Chinese Lute' River), ca. 2 - 3 m wide, shaded, very shallow, sometimes even vanishing beneath the gravel of sandstone and occasional limestone, ca. 650 m a.s.l.; 29.X.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 22: **Human Province**; Xiangxi Prefecture; Dayong County; Zhangjiajie Forest National Park, Suoxiyü Nature Reserve, Wulingyuan section (ca. 30 km N Dayong City); ca. 500 m upstream of Shuitaosimen bus station; tributary of Jinbian Xi (Gold Whip River), slowly flowing, 0.5 - 1.0 m wide; 30.X.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 25: **Human Province**; Xiangxi Prefecture; Dayong County; Zhangjiajie Forest National Park, Suoxiyü Nature Reserve, Wulingyuan section (ca. 30 km N Dayong City); ca. 3 km upstream Suoxiyü City; small tributary of Suo Xi, partly shaded, with large boulders, small waterfalls and pools, ca. 450 m a.s.l.; 31.X.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 29: **Human Province**; Huaihua Prefecture; Huitong County; Guangping Township; Moshao Village, ca. 15 km W Guangping Town; south slope below the upper Research Station of Academia Sinica; small stream in a deep ravine, shaded, unpolluted, secondary (broadleaf) vegetation, ca. 450 - 550 m a.s.l.; 3.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 30: **Human Province**; Huaihua Prefecture; Huitong County; Guangping Township; Moshao Village, ca. 15 km W Guangping Township; ca. 5 km N of upper Research Station of Academia Sinica; small stream, flowing through planted forest (Chinese fir, *Cunninghamia lanceolata*) and rice fields, slightly polluted, ca. 350 m a.s.l.; 4.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 32: **Human Province**; Huaihua Prefecture; Huitong County; Jinlong Shan (= Golden Dragon Mountain); ca. 30 km NE Huitong City; forest stream, ca. 2 - 3 m wide, unpolluted, shaded, large boulders, small waterfalls and flat stretches with shingle and moss-covered stones; pools and accumulations of decaying plant material, upper reaches through broadleaf forest, lower reaches through *Cunninghamia* forest, amphibolite, ca. 600 - 650 m a.s.l.; 5.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 35: **Human Province**; Huaihua Prefecture; Huitong County; Guangping Township; 2 km upstream of loc. 30, near Moshao Village; small stream, 0.5 - 1 m wide, partly canalized, partly vanishing beneath the gravel, ca. 400 m a.s.l.; 7.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 38: **Guangxi Autonomous Region**; Liuzhou Prefecture; ca. 10 km NE Liuzhou City; ca. 2 km E

Shanmenjiang Forest Station; small stream, ca. 0.3 - 0.5 m wide, with accumulations of decaying plant material, ca. 200 m a.s.l.; 10.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 42: **Guangxi Autonomous Region**; Yülin Prefecture; Liuwan Da Shan (Sixty-thousand Mountains); 30 km SW Yülin City; several streams in the vicinity of Liuwan Forest Station, 0.5 - 1.0 m wide, rather sandy, rich riverside vegetation (original), slopes covered with planted forest of mainly *Cunninghamia lanceolata*, crystalline rock, 350 - 400 m a.s.l.; 16.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 43: **Guangxi Autonomous Region**; Yülin Prefecture; Liuwan Da Shan; small, steep mountain streams on the S slope of Kui Shan Ding (Helmet Mountain), cataracts, large crystalline boulders, coarse sand, dense vegetation, slopes covered with planted forest, 600 - 700 m a.s.l.; 17.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 45: **Guangxi Autonomous Region**; Yülin Prefecture; Liuwan Da Shan, 20 km E of Liuwan Forest Station; foot hills of Kui Shan Ding; upstream of Zhongxin Substation; small, steep stream, large crystalline boulders, 0.3 - 0.4 m wide, rich riverside vegetation, ca. 300 m a.s.l.; 18.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 49: **Guangxi Autonomous Region**; Yülin Prefecture; Liuwan Da Shan; ca. 2 km upstream of loc. 42, 0.3 - 0.5 m wide, flowing through rather flat area, rather sandy, ca. 500 m a.s.l.; 20.XI.1993; leg. Schönmann, Schillhammer & Ji

CWBS loc. 60: **Yünnan Province**; Lijiang Autonomous Prefecture; Lijiang County; 15 km N Lijiang City; small valley near the abandoned airport; small stream, 0.5 - 1.0 m wide, limestone, 2800 m a.s.l.; 6.VII.1994; leg. Schillhammer & Ji

CWBS loc. 70: **Jilin Province**; Yanbian Korean Autonomous Prefecture; Antu County; Changbai Shan Biosphere Reserve; Erdao Bai He, close to loc. 68, ca. 10 m wide, gravel bank, fast flowing, 1700 m a.s.l.; 16.VIII.1994; leg. Jäch, Ji & Wang

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Check list of the species of *Hydrocassis* DEYROLLE & FAIRMAIRE

- | | |
|--|---|
| 1. <i>H. baoshanensis</i> sp.n.
[?= <i>Hydrocylus formosus</i> KNISCH] | 6. <i>H. scaphoides</i> d'ORCHYMONT
[?= <i>Hydrocylus formosus</i> KNISCH] |
| 2. <i>H. imperialis</i> (KNISCH)
[?= <i>Hydrocylus formosus</i> KNISCH] | 7. <i>H. scapulata</i> DEYROLLE & FAIRMAIRE
[?= <i>Hydrocylus formosus</i> KNISCH] |
| 3. <i>H. lacustris</i> (SHARP) | 8. <i>H. schillhammeri</i> sp.n.
[?= <i>Hydrocylus formosus</i> KNISCH] |
| 4. <i>H. metasternalis</i> sp.n.
[?= <i>Hydrocylus formosus</i> KNISCH] | 9. <i>H. taiwana</i> SATÔ |
| 5. <i>H. scapha</i> d'ORCHYMONT
= <i>H. vietnamica</i> SATÔ | |

Check list of the species of *Ametor* SEMENOV

- | | |
|---|---|
| 1. <i>A. latus</i> (HORN) | 3. <i>A. rugosus</i> (KNISCH) comb.n.
= <i>A. rufrenus</i> (d'ORCHYMONT) syn.n. et comb.n. |
| 2. <i>A. rudesculptus</i> SEMENOV
= <i>A. oberthuri</i> (d'ORCHYMONT) syn.n.
= <i>A. wittmeri</i> (SATÔ) syn.n. | 4. <i>A. scabrosus</i> (HORN)
= <i>A. lucifer</i> (SHATROVSKIY) syn.n. et comb.n. |

Key to species groups and species of *Ametor* and *Hydrocassisi*

- 1 Body slightly to moderately convex; rugulose sculptured between elytral punctures; body outline elongate oval. Hind angles of pronotum broadly rounded; hind margin not much wider than front margin. Elytra sometimes moderately widened in distal half (*Ametor scabrosus* group) 2
- Body moderately to strongly convex; smooth between punctures 3
- 2 Small species. Eleventh elytral interval forming a ridge which, at least in distal half conceals lateral margins (EI 1.33). Hind margin of last visible sternite entire, without apical emargination. Aedeagus (Fig. 15). 3.8 - 6.5 mm *A. scabrosus*
- Larger species. Elytra without lateral ridge (EI 1.33). Hind margin of last visible sternite with distinct emargination fringed by stiff setae. Aedeagus (Fig. 19). 8.0 - 9.5 mm *A. rudesculptus*
- 3 Brown species. Hind angles of pronotum broadly rounded. (EI 1.29) (*Ametor latus* group). Aedeagus (Fig. 18). Nearctic region only. 5.8 - 6.7 mm *A. latus*
- Black species. Hind margin of pronotum usually much wider than front margin; hind angles narrowly rounded 4
- 4 Elytra moderately convex, elongate (EI 1.23). Aedeagus (Fig. 16, 17). Median lobe with lateral appendages, corona situated on the apex (*Ametor rugosus* group). 6.5 - 9.0 mm *A. rugosus*
- Body outline broadly oval, strongly convex (EI 1.03 - 1.19). Median lobe without lateral appendages, corona situated near the middle. Within this group three species groups are distinguished by their aedeagal features. (*Hydrocassisi*) 5
- 5 Parameres with tooth-like projections on inner surface. (*Hydrocassisi scaphoides* group) 6
- Parameres without tooth-like projections 8
- 6 Projections situated near apex of parameres, slightly pointing to base; apex of median lobe sharply narrowed in distal fifth, abruptly widened to base. Body outline distinctly rounded. Pronotum only with few coarse punctures. Elytral striae feebly impressed, only few isolated coarser punctures on interstices (EI 1.06). Aedeagus (Fig. 10, 11). 7.2 - 8 mm *H. scaphoides*
- Projections on parameres situated in distal half but closer to middle 7
- 7 Head and pronotum black, densely and regularly punctate with coarse punctures; sides of clypeus and pronotal margins brown. Elytra usually brown with dark spots, seldom black (EI 1.17). Projections on parameres somewhat curved, pointing dorsad. Aedeagus (Fig. 13). 8.5 - 9.0 mm *H. schillhammeri*
- Head and pronotum black, with few, scattered, coarse punctures. Head with metallic sheen. Elytra black (EI 1.11). Projections on parameres flat, pointing towards middle. Aedeagus (Fig. 12). 7.2 - 8.5 mm *H. baoshanensis*
- 8 Body form strongly rounded (EI 1.03 - 1.06). Elytra with series of coarser punctures inconspicuous. Median lobe and parameres slender, gradually narrowed to apex. (*Hydrocassisi scapha* group) 9
- Body form less rounded (EI 1.08 - 1.19). Median lobe abruptly narrowed towards apex, distal portion sometimes compressed; parameres considerably narrowed in distal third (narrowed gradually from base to apex in *H. metasternalis*). (*Hydrocassisi scapulata* group) 10
- 9 EI 1.03. Aedeagus slender (Fig. 2, 3); sides of parameres almost straight, gradually widened to base. 6.5 - 7.8 mm *H. scapha*
- EI 1.06. Aedeagus slightly stouter (Fig. 4); sides of parameres more abruptly widened to base. 6.2 - 7.5 mm *H. imperialis*
- 10 Large species with elytra rather elongate (EI 1.19). Aedeagus (Fig. 8); median lobe strongly narrowed and compressed on apical portion. 8.5 - 9.0 mm. Endemic to Taiwan *H. taiwana*
- Smaller species (6.8 - 8.0 mm). Elytra less elongate to subcircular. (EI 1.08 - 1.14). Species with different distribution 11

- 11 Endemic to Japan. (EI 1.14). Aedeagus (Fig. 6, 7). 6.8 - 8.0 mm *H. lacustris*
 - Species with different distribution 12
- 12 Coarse punctures on pronotum arranged densely and evenly. Elytral striae distinctly impressed, lateral interstices convex; primary punctures on elytra situated on minute protuberances (umbilicate) (EI 1.08 - 1.14). Aedeagus (Fig. 5); apical portion of median lobe narrow, abruptly widened towards base; parameres narrowed in distal portion, apically roundly widened; abruptly widened towards base. 7.2 - 8.0 mm *H. scapulata*
 - Pronotum smooth and shining, with sparse coarser punctures; elytral interstices flat, primary punctures not situated on protuberances (EI 1.14). Aedeagus (Fig. 9); median lobe narrowly rounded towards apical half, widened more gradually; Parameres gradually widened towards base, somewhat angulate. 7.5 - 8.5 mm *H. metasternalis*

Taxonomy

The genera *Hydrocassis* and *Ametor* belong to the tribe Sperchopsini (HANSEN 1991) which is defined by the margins of the elytra being finely serrate or denticulate. Pronotum with double punctation, consisting of minute, regularly dispersed primary punctures, intermixed with coarser punctures.

HANSEN (1991) treated *Hydrocassis* and *Ametor* as distinct genera. The separation was based on external characters, in particular differences of the elytral interstices and the epipleura. Following HANSEN (1991) the elytral interstices in *Hydrocassis* are smooth between the punctures, whereas in *Ametor* they are granulose to rugulose punctate. The epipleura are oblique in the former, horizontal in the latter. Because only "typical" species of *Hydrocassis* and *Ametor* were studied by HANSEN (1991), a distinct segregation of the genera resulted.

Study of all the species of both genera shows clearly that the situation is far more complicated than supposed by former authors. Two species, namely *Ametor rugosus* (KNISCH) and *A. latus* (HORN) do not agree with Hansen's generic diagnoses.

Hydrocylus rugosus KNISCH (1924b) was transferred to *Ametor* by d'ORCHYMONT (1928), but later (d'ORCHYMONT 1942) transferred to *Hydrocassis*. In the same paper, d'ORCHYMONT (1942) described *Hydrocassis rufrena*. After study of type material of both species, *Hydrocassis rufrena* must be considered a junior synonym of *H. rugosa*, which here again is incorporated in *Ametor*.

Ametor rugosus, a most variable species, has smooth elytral intervals but a perfectly "Ametor-like" aedeagus. Smaller specimens particularly, externally resemble typical *Hydrocassis*; larger ones are less convex, their elytral intervals less smooth and they resemble typical *Ametor*. In addition, the pronotum of this species has rather narrowly rounded hind angles and resembles that of *Hydrocassis*.

Ametor latus also resembles *Hydrocassis* in its convex body, in the elytral intervals being smooth between punctures and in the oblique epipleura.

Of course, far too little material has been studied yet to state clearly in which way the two above mentioned species represent links between *Hydrocassis* and *Ametor*. External features are poor and show nuances between the two genera and thus are not appropriate for separation in a phylogenetic sense. Besides, it has not been established yet which of the characters are plesiomorphic and which are derived. Thus, phylogenetic investigations are not the goal of this study. Moreover, only one distinct character in the male genitalia has yet been discovered to separate *Hydrocassis* from *Ametor*: In *Ametor* the median lobe bears lateral appendages and the corona is always situated at its apex. In *Hydrocassis* the median lobe never has such appendages and the corona is situated near the middle of the median lobe, never at its apex.

However, as *Ametor rugosus* and *A. latus* apparently are somewhat intermediate between *Hydrocassis* and *Ametor* in external characters, the question arose how to resolve this confusion. To leave the genera separated and downgrade them to subgenera of *Hydrocassis* would have left the problem unsolved. *Hydrocassis* (*Ametor* included) would have turned out to be a paraphyletic taxon. As a result, *Hydrocassis*, an apparently monophyletic group, and *Ametor*, inhomogenous and paraphyletic with probably derived, convergent characters, here are treated separately. Thus, the term "species group", used in both genera, cannot be considered equally.

Female genitalia and hind wing venation have not been examined. The larvae of most species are as yet unknown. SPANGLER (1962) described the larva and pupa of *Ametor scabrosus* (HORN).

***Hydrocassis* DEYROLLE & FAIRMAIRE, 1878**

Hydrocassis DEYROLLE & FAIRMAIRE 1878: 88. - KNISCH 1921, 1924a. d'ORCHYMONT 1928, 1942. HANSEN 1991. *Hydrocylus* SHARP 1884: 451. - KNISCH 1921, 1924a. d'ORCHYMONT 1928 (synonymy), 1942.

Type species: *Hydrocassis scapulata* DEYROLLE & FAIRMAIRE 1878: 89 (by monotypy).

Moderate sized (6.0 - 9.0 mm), brown to black, convex.

Dorsal surface glabrous, appendages on head, tibiae and tarsi brown, lateral margins of pronotum yellowish to reddish; ventral side covered with dense hydrofuge pubescence. General form of body broadly oval and strongly convex dorsally; its outline not or only slightly interrupted between pronotum and elytra.

Head dark brown to black, lateral margins paler; eyes moderately convex, the punctures on inner margin of eyes rugose; labrum fully visible in front of clypeus, anterior margin emarginate medially; maxillary palpi slender, apical segment longer than penultimate, asymmetrical, straight or weakly convex on the inner surface; antennae 9-segmented, last three segments forming a club.

Pronotum brown to black, lateral margins often yellowish or reddish brown, both head and pronotum with very fine primary punctation intermixed with coarser punctures, smooth and shining between punctures; lateral margins of pronotum slightly, often inconspicuously serrate or crenulate, widest near base, strongly narrowed anteriorly; hind angles narrowly rounded.

Elytra evenly convex, brown to black, margins slightly, often inconspicuously serrate, with ten well-developed punctate striae; in addition, each elytron with a short scutellary stria; intervals with fine primary punctation; 1st, 3rd, 5th, 7th, 9th and 11th interval with a longitudinal series of coarser punctures or impressions (EI 1.03 - 1.19).

Prosternum slightly keeled longitudinally, with a more or less distinct, tooth-like projection antero-medially, followed by a transverse impression. Mesosternum with a well-developed, prominent, blunt, transverse elevation postero-medially. Metasternum short, raised medially, anteriorly with a raised projection between mesocoxae.

Hind femora with hydrofuge pubescence on basal half. Tarsal claws robust, moderately curved.

Posterior margin of last visible sternite with a shallow emargination, with a fringe of stiff setae.

Aedeagus: Median lobe elongate, narrowed towards apex, gradually or abruptly widened towards base. Parameres narrowed towards apical half or with tooth-like projections on inner surface. Corona close to middle of median lobe.

Distribution: The genus *Hydrocassis* is almost exclusively Chinese. Most species occur in South and Central China; a few are found in surrounding countries: Japan, Burma, Vietnam.

Habitat: The species occur in small, slowly flowing streams, amongst gravel and especially in decaying plant material.

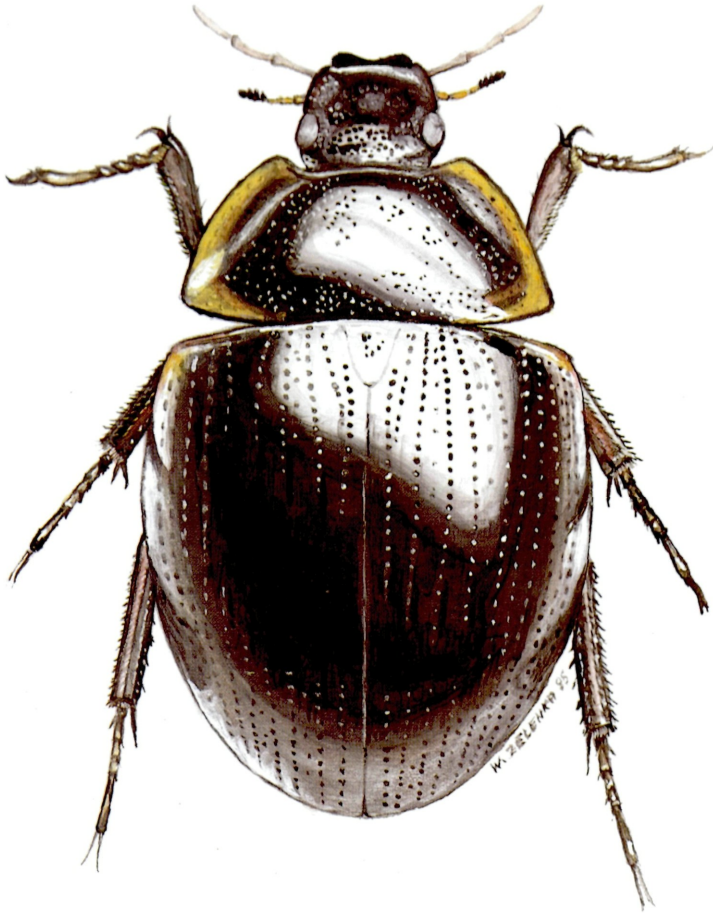
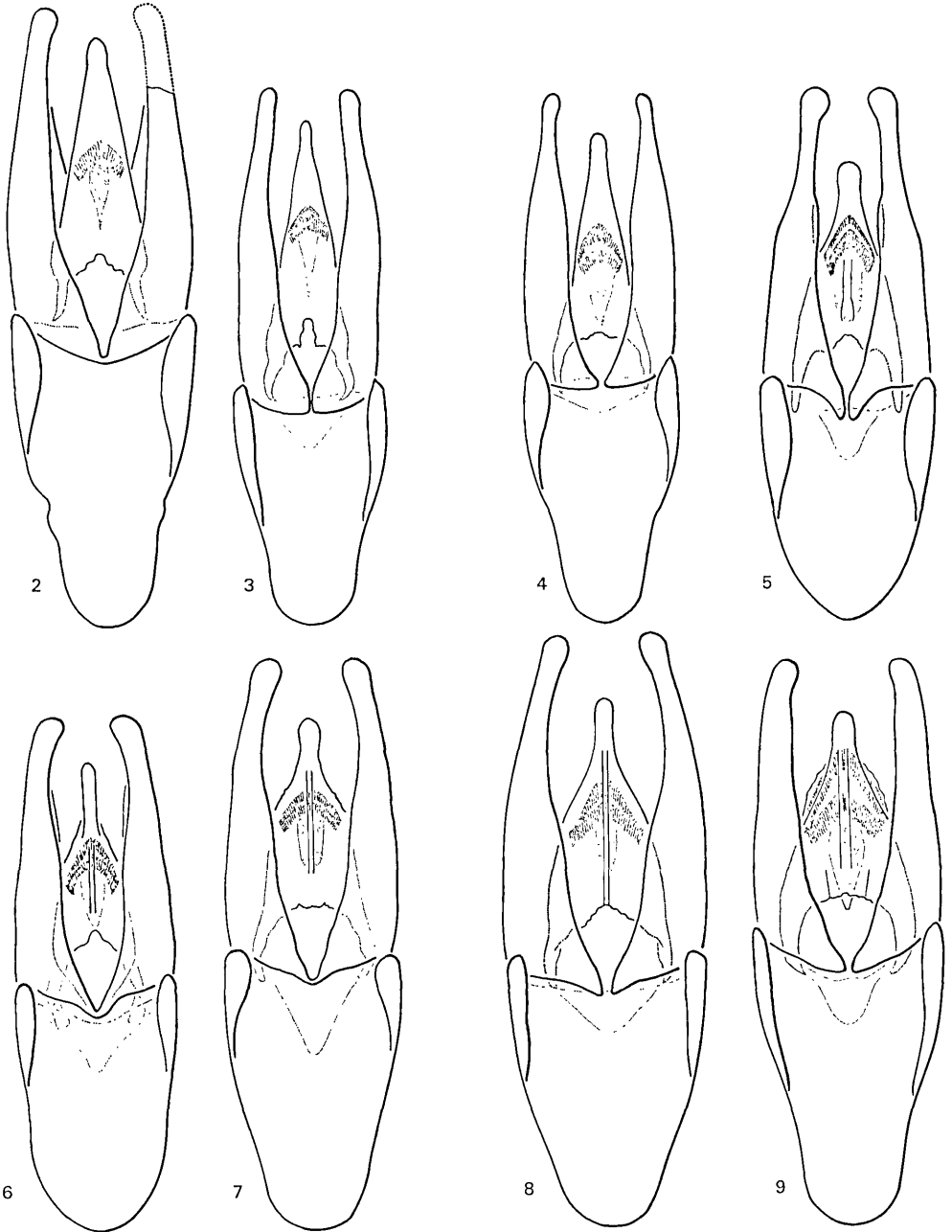


Fig. 1: Habitus of *Hydrocassis baoshanensis* sp.n.

Hydrocassis comprises nine species. Dissection of male genitalia in most cases is necessary for exact determination. Sometimes, males can be separated from females by the coarser punctation of the pronotum.

Three species groups are distinguished, based on the shape of the aedeagus, especially the parameres and the median lobe.

Hydrocycylus formosus KNISCH (1921) which, following the original description is to be placed in this genus, is not included here. The single type specimen from "Fo-Kien" [= Fujian, China] was deposited in the ZMUH and was destroyed during World War II. Many of the species of *Hydrocassis* are variable and several species treated here agree with the original description of *H. formosus* in some ways. Thus it is impossible to state whether one is a synonym of *H. formosus*. As we have only little knowledge about the distribution of the species, more material, especially from Fujian needs to be examined.



Figs. 2 - 9: Aedeagus of 2) *Hydrocassis scapha*, holotype; 3) *H. scapha*, specimen from Huitong; 4) *H. imperialis*, neotype; 5) *H. scapulata*; 6, 7) *H. lacustris* (two different specimens from Honshu, showing the variability); 8) *H. taiwana*; 9) *H. metasternalis* sp.n., paratype.

1. *Hydrocassis scapha* group

This group comprises two subcircular species (*Hydrocassis imperialis* and *H. scapha*) which are characterized by a slender, elongate aedeagus.

Hydrocassis imperialis (KNISCH)

Hydrocylus imperialis KNISCH 1921: 101, 105. - KNISCH 1924a.

?*Hydrocylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

TYPE LOCALITY: Jinggang Shan, Jiangxi, China.

TYPE MATERIAL: Neotype ♂ (here designated): "CHINA Jiangxi W JINGGANG SHAN Ciping env. 2-14.VI.1994" (NMW).

The single type specimen of *Hydrocylus imperialis* ("China, Prov. Fokien" [= Fujian]), originally deposited in the ZMUH, was destroyed during World War II. According to the original description and the fact that material from Fujian, the original type locality of *H. imperialis*, was studied, a neotype is here designated.

DIAGNOSIS: 6.2 - 7.5 mm. Body dark brown to black, form oval, strongly convex. Head with coarser punctures densely and evenly distributed, front margin of clypeus only with fine primary punctation; labrum, sides of clypeus and appendages on head reddish; maxillary palpi slender. Coarse punctures on pronotum sparsely distributed on disc, more densely near lateral margins; basal corners narrowly angulate, pronotum finely margined; lateral margins inconspicuously serrate, sides brownish to reddish. Elytra short (El 1.06), highly convex; elytral striae partly reduced to rows of punctures, particularly near base; short additional scutellary stria between 1st and 2nd stria; intervals flat to moderately convex near apex and sides, smooth and glabrous between punctures; coarser impressions on alternate interstices shallow and vague; lateral margins distinctly serrate.

Underside piceous, covered with fine hydrofuge pubescence. Mentum brownish, rugulose punctate. Prosternum with sharp, tooth-like projection antero-medially. Mesosternum with distinct, blunt, Λ -shaped protuberance postero-medially, followed by a short carina. Metasternum highly raised and Λ -shaped anteriorly. Fifth sternite with distinct emargination on posterior margin. Pubescence of hind- and mid femora $> 1/2$, on front legs $= 1/2$.

Aedeagus (Fig. 4): Median lobe gradually widened towards base; parameres considerably longer than median lobe, narrow in distal portion, somewhat abruptly widened towards base.

This species is most similar to *Hydrocassis scapha* and only separable in the male.

DISTRIBUTION (Fig.21): China (Hunan, Jiangxi, Fujian).

ADDITIONAL MATERIAL EXAMINED:

CHINA: JIANGXI: 2 exs. with same data as neotype (NMW). FUJIAN: "Kuatun" [= Guadun], 2.IV., 2.V.1946, leg. Tschung sen. (MNS, NMW). HUNAN: CWBS loc. 20, 22, 25.

Hydrocassis scapha d'ORCHYMONT

?*Hydrocylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

Hydrocassis scapha d'ORCHYMONT 1942: 13.

Hydrocassis vietnamica SATO 1995: 129 (= syn.n.).

TYPE LOCALITY: "Chine: Chekiang: S. Ning-Po" [= Zhejiang, S Ningbo], China.

TYPE MATERIAL: Holotype ♂ (ISNB), examined: "Coll.R.I.Sc.N.B. Chine Chine: Chekiang: Env. de Taichan au S. de Ning-Po Coll.d'Orchym. / A.d'Orchymont det. *Hydrocassis scapha* m. / TYPE". Apical half of one paramere missing.

SYNONYM: One paratype ♀, "Mt. Tam Dao N. Vietnam 26-IX-1994 M. Satô leg. \ Paratype

Hydrocassis vietnamica M. Satô, 1995" (WUN) has been examined. External features, description and the illustration of the aedeagus of *H. vietnamica* in combination with the distribution make the synonymy with *H. scapha* very probable.

DIAGNOSIS: 6.5 - 7.8 mm. This species resembles *Hydrocassis imperialis* in most characters, except the slightly denser, coarse punctures on discal part of pronotum and the slightly deeper punctures on alternate elytral intervals. Body outline subcircular, elytra shorter than in *H. imperialis* (EI 1.03). Elytral intervals smooth between punctures; coarse punctures on alternate interstices shallow, but distinct. Raised antero-medial portion of metasternum more \cap -shaped (Δ -shaped in *H. imperialis*).

Aedeagus (Fig. 2, 3): Similar to *H. imperialis*, but more elongate. Median lobe slender, slightly flattened dorso-ventrally on apex, gradually widened to base. Parameres slender, evenly curved, gradually widened to base, only little longer than median lobe (considerably longer in *H. imperialis*).

DISTRIBUTION (Fig. 21): China (Hunan, Guangxi), N-Vietnam.

ADDITIONAL MATERIAL EXAMINED:

CHINA: HUNAN: CWBS loc. 20, 25, 29, 30, 32, 35. GUANGXI: CWBS loc. 38, 42, 43, 45, 49.

VIETNAM: Mt. Tam Dao, 26.IX.194, leg. Satô (WUN; paratype of *H. vietnamica*).

2. *Hydrocassis scapulata* group

Four species, *Hydrocassis lacustris*, *H. metasternalis*, *H. scapulata* and *H. taiwana* are included in this group. Their aedeagi have the median lobe abruptly narrowed apically, sometimes compressed, strongly and abruptly widened towards base; parameres distinctly narrowed in distal third or (*H. metasternalis*) narrowed gradually from base to apex.

Hydrocassis lacustris (SHARP)

Hydrocylus lacustris SHARP 1884: 451. - KNISCH 1921, 1924a.

Hydrocassis lacustris (SHARP): d'ORCHYMONT 1928 (synonymy), 1942. - SATÔ 1985.

TYPE LOCALITY: Chuzenji-ko, Nikko, Honshu, Japan.

TYPE MATERIAL: Lectotype ♂ (by present designation): "Hydrocylus lacustris. Type D.S. Chiuzenji [= Chuzenji-ko] 24.8.81. Lewis \ Type H.T. \ Japan G. Lewis. \ Sharp Coll. 1905-313" (BML). Paralectotypes: 1 ex.: "Hydrocylus lacustris Nikko. June 1880 Lewis. \ Japan G. Lewis \ Sharp Coll. 1905-313" (BML). One topotype "Nikko" in the ISNB. According to SHARP (1884) there should be additional syntypes, the depository of which is unknown ("This is a lake species, occurring in water of low temperature, and has been found at Hakone [= Numazu] and Chiuzenji").

DIAGNOSIS: 6.2 - 8.0 mm. Body dark brown to black, body outline rounded, variable in pronotal punctation. Usually with only few coarser punctures on pronotal disc; lateral portion sometimes paler, margins vaguely serrate. Elytral intervals smooth between punctures, flat near suture, moderately convex apically; primary punctures sometimes umbilicate on inner intervals (EI 1.14).

Aedeagus (Fig. 6, 7): Apical area of median lobe narrowed in frontal view, compressed and bent ventrad; apical third of parameres narrowed and bent inward, apical portion expanded.

DISTRIBUTION (Fig. 21): So far known only from Japan.

ADDITIONAL MATERIAL EXAMINED:

JAPAN: KYUSHU: Kumamoto Pref., Takema, Kahoku Town, 29.V.1994 leg. Matsui (NMW); Gifu Pref., Yourou Park, Gifu City, 5.V.1994, leg. Matsui (NMW). HONSHU: Mie-Pref., Misugi, 24.III.1955 (ISNB); Mie. Univ. Forest, Ichishi-Gun Mie, 24.VI.1956 (ISNB); Nikko (ISNB); Yamanashi Pref., Daibosatsu Pass, 17.V.1964, leg. Watanabe (WUN, NMW); Nagano Pref., Uriki-tôge, 25.VIII.1958, leg. Satô (WUN, NMW).

Hydrocassis metasternalis* sp.n.?Hydrocycylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

TYPE LOCALITY: Gaoligongshan Nat. Res., 100 km W Baoshan, Yünnan, China.

TYPE MATERIAL: Holotype ♂: "CHINA - Yunnan, 14.-21.6. 100 km W Baoshan, 1993 Gaoligongshan Nat. Res. E.Jendek & O.Sausa leg." (NMW). Paratypes: 13 exs. (♂ ♂ + ♀ ♀), labelled as holotype (NMW, CASS).

DIAGNOSIS: 7.5 - 8.5 mm. Body brown to black, form oval, strongly convex. Head with dense, coarse punctation in posterior half; appendages of head brownish; maxillary palpi slender. Pronotum of female with only few coarse punctures, sometimes with metallic sheen; male with more densely arranged, coarser punctures; basal corners of pronotum broadly angulate, sides and lateral portion of base yellowish; lateral margins even, not serrate. Elytra highly convex, intervals smooth between punctures; coarse punctures on alternate intervals feebly impressed, lateral margins of elytra distinctly serrate in posterior half (EI 1.14). Underside piceous black. Mentum rugulosely punctate. Prosternum and mesosternum as in other species. Metasternum moderately convex, the antero-median raised portion not A-shaped, simply projecting between mesocoxae (distinctive for this species).

Aedeagus (Fig. 9): Robust. Median lobe with narrowly rounded apical portion, considerably shorter than parameres; parameres evenly curved or slightly angulate and gradually widened towards base, not distinctly narrowed in distal portion (frontal view); distal portion depressed; basal piece and parameres equally long.

This species is similar to both *H. scapha* and *H. imperialis* but differs from both in the rounded hind angles of the pronotum, the more elongate elytra, the shape of the metasternum and the aedeagus.

DISTRIBUTION (Fig. 21): So far only known from the type locality.

Hydrocassis scapulata* DEYROLLE & FAIRMAIRE?Hydrocycylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.*Hydrocassis scapulata* DEYROLLE & FAIRMAIRE 1878: 88. - KNISCH 1924a. d'ORCHYMONT 1942.

TYPE LOCALITY: "Chine centrale", no precise data known.

TYPE MATERIAL: Lectotype ♂ (here designated) (MHNP): "TYPE \ Hydrocassis scapulata Fairm. China \ MUSEUM PARIS Collection Léon Fairmaire 1906" (number of syntypes unknown).

DIAGNOSIS: 7.2 - 8.0 mm. Black or brown with scattered, darker patches on elytra. Head and pronotum densely and regularly covered with coarse punctures; sides of pronotum yellowish to reddish-brown, lateral margins serrate; basal corners of pronotum rounded. Elytra distinctly striate, interstices moderately convex; primary punctation on elytral intervals umbilicate, rugulosely punctate, particularly in specimens from Sichuan; coarser punctures on alternate intervals vague to distinct; first interval gradually elevated towards apex (EI 1.08 - 1.14).

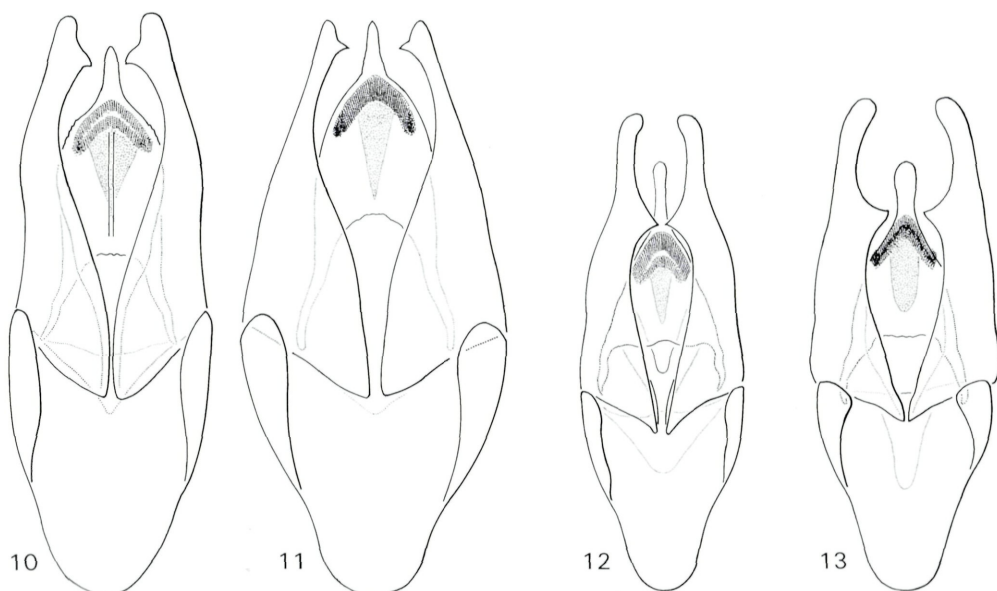
Specimens from Sichuan are considerably larger and darker, with coarser punctation on pronotum denser and elytral striae more strongly impressed.

Aedeagus (Fig. 5): Rather robust. Parameres narrowed and rounded in apical half, apex expanded; abruptly widened towards base; median lobe narrowed apically, compressed.

DISTRIBUTION (Fig. 21): China ("Central China" (original description), Shaanxi, Sichuan)

ADDITIONAL MATERIAL EXAMINED:

C H I N A: "Chine", leg David (MHNP). SHAANXI: "Shen-Si" [= Shaanxi], 27.IV.1875, leg. David (MHNP). SICHUAN: Shimian, 1.V.1992 (NMW, CASS).



Figs. 10 - 13 : Aedeagus of 10) *Hydrocassis scaphoides*, paratype; 11) *H. scaphoides*, specimen from Yunnan (teneral); 12) *H. baoshanensis* sp.n., paratype; 13) *H. schillhammeri*, paratype.

Hydrocassis taiwana SATO

Hydrocassis taiwanus [!sic] SATO 1971: 35.

TYPE LOCALITY: Beidawu Shan (= Daibu San or Tawu Shan), border between Pingtung and Taitung County, 22°33'N / 120°45'E, south Taiwan.

TYPE MATERIAL: One paratype ♀ (examined): "Formosa T. Kano \ Tawushan [= Beidawu Shan] 28.III.1929 \ T. Kano Collection \ Paratype *Hydrocassis taiwanus* M. Satō DET.M.SATO 1971" (WUN, coll.Satō).

DIAGNOSIS: One of the largest species in this genus, 8.0 - 9.0 mm. Body outline elongate oval, moderately convex. Head and pronotal disc black, sometimes with metallic sheen; elytra dark brown to piceous black; dorsal surface shining, smooth between punctures. Head with coarse punctures except central frontal area. Pronotum with only few scattered, coarse punctures, lateral sides yellowish to brownish; lateral margins finely serrate, pronotum margined. Elytra more elongate and less convex than in other species (El 1.19); intervals flat, smooth between punctures, coarser punctures on alternate intervals shallowly impressed.

Aedeagus (Fig. 8): Similar to *H. lacustris*, but more robust; parameres longer, somewhat more angulate, especially on inner surface; median lobe distinctly narrowed, only weakly compressed.

DISTRIBUTION (Fig. 21): Endemic to Taiwan.

ADDITIONAL MATERIAL EXAMINED:

CHINA: TAIWAN: Kaohsiung, Tienchu, Kwaigu, 31.X.1992, leg. Jeng & Chou (NMW); Nantou Hsien, Hohwan Stream (26), 2.VII.1989, leg. C.F. Lee (NTU, NMW); Xiaoshüeshan, Taichung, 15.VI.1989, leg. Satō (WUN, NMW).

3. *Hydrocassis* (s.str.) *scaphoides* group

This species group comprises three species, *Hydrocassis baoshanensis* sp.n., *H. scaphoides* and *H. schillhammeri* sp.n. and is defined by the parameres always having a tooth-like projection on their inner surface.

Hydrocassis baoshanensis sp.n.

?*Hydrocylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

TYPE LOCALITY: Baoshan, W-Yünnan, South China.

TYPE MATERIAL: Holotype ♂ (NMW): "CHINA, W - Yunnan, env. Baoshan, 5.- 8.6.1993, E. Jendek & O. Sausa leg.". Paratypes: 35 exs. (♂♂ + ♀♀), labelled as holotype (NMW, CASS).

DIAGNOSIS: Habitus (Fig. 1). 7.2 - 8.5 mm. Body dark brown to black, body outline broadly oval, dorsal surface shining, smooth between punctures. Head with coarser punctures on posterior half and lateral area; sides of clypeus reddish; maxillary palpi slender, reddish. Pronotum with coarse punctures sparsely distributed on disc, more densely near lateral margins; sides yellowish to reddish, narrowly in anterior half, broadly so in posterior half; lateral margins inconspicuously serrate, pronotum finely margined. Elytra strongly convex; striae partly reduced to series of punctures, particularly in anterior half; interstices flat, coarser punctures on alternate intervals moderately impressed, lateral margins of elytra serrate (EI 1.11). Underside piceous, covered with hydrofuge pubescence. Mentum and postmentum black, rugulose punctate, gula brownish. Pro-, meso- and metasternum not distinctive, similar to other species. Fifth sternite with emargination on posterior margin. Femora of legs pilose basally, nonpubescent distal portion with few fine punctures.

This species is similar to *Hydrocassis scaphoides* from which it can be distinguished with certainty only by the different shape of the aedeagus. Other characters to separate *H. scaphoides* from *H. baoshanensis* are the more densely arranged coarser punctures on the pronotum in *H. baoshanensis*, the body outline oval (more rounded in *H. scaphoides*).

Aedeagus (Fig. 12): Median lobe strongly narrowed in apical third. Parameres longer than phallobasis; projection on inner surface flat, apically sharp, pointing somewhat towards base.

DISTRIBUTION (Fig. 21): So far only known from the type locality.

Hydrocassis scaphoides d'ORCHYMONT

?*Hydrocylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

Hydrocassis scaphoides d'ORCHYMONT 1942: 14. - HANSEN 1991.

TYPE LOCALITY: Mong Mit, Shan State, Burma.

TYPE MATERIAL: We have not seen the holotype, which probably is deposited in Indian Museum Calcutta. Six paratypes (♂♂ + ♀♀) deposited in the ISNB, have been examined: "Coll. R.I.Sc.N.B., Birmanie U Burma. Monginit State, 4200 ft, Man Ton, Ruby Mines dist. Feb.-April 1915. J. Coggin Brown \ A.d'Orchymont det. *Hydrocassis scaphoides* m. \ Paratype"

DIAGNOSIS: 7.2 - 8.0 mm. Brown to black with sides of pronotum reddish, more broadly so near basal corners. Body outline subcircular. Head smooth and shining with coarse punctures on posterior half and lateral area. Pronotum smooth and shining, with only few coarse punctures on disc, coarse punctures more densely arranged near sides and base; lateral margins not serrate. Elytra short (EI 1.06), intervals smooth and shining between punctures; coarser punctures on alternate interstices feebly impressed; lateral margins of elytra finely serrate, particularly in posterior half. Prosternum with a well-developed, tooth-like projection antero-medially. Mesosternum with high, slightly angulate transverse protuberance posteriorly, followed by a short longitudinal keel. Metasternum raised antero-medially between mesocoxae.

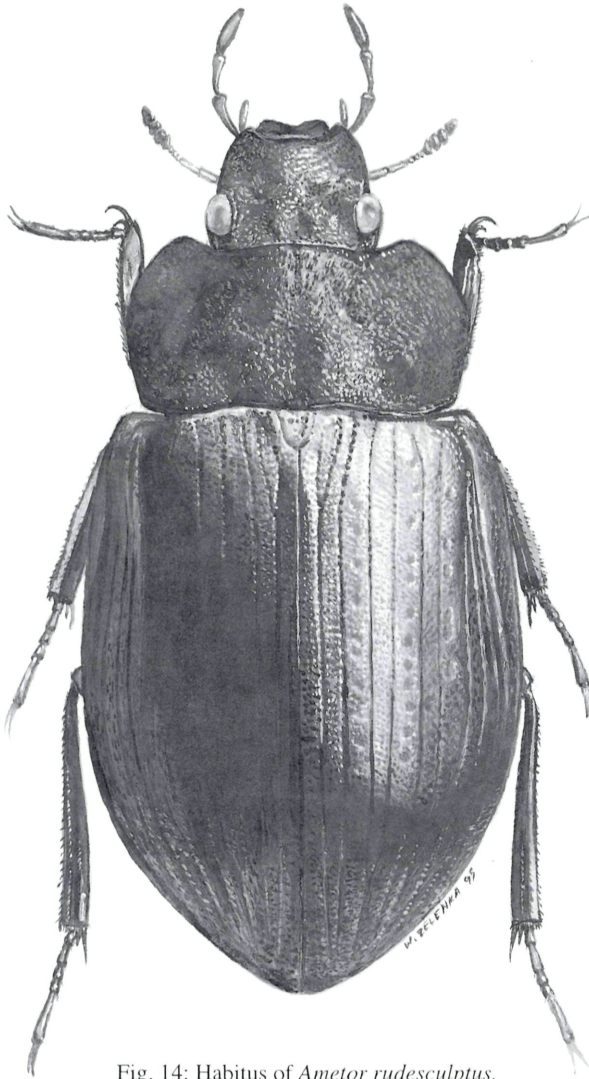


Fig. 14: Habitus of *Ametor rudesculptus*.

Aedeagus (Fig. 10, 11): Very distinct, with tooth-like projection on inner surface of parameres situated near the apex. Median lobe abruptly widened towards base.

DISTRIBUTION (Fig. 21): Burma (Shan State), China (Yünnan).

ADDITIONAL MATERIAL EXAMINED:

CHINA: Yünnan (MHNP).

***Hydrocassis schillhammeri* sp.n.**

?*Hydrocylus formosus* KNISCH 1921: 101, 103. - KNISCH 1924a.

TYPE LOCALITY: Lijiang Autonomous Prefecture, 1800 m, Yünnan Province, southern China.

TYPE MATERIAL: Holotype ♂ (NMW): "China Yunnan, 1800 m LIJIANG 23.6.-21.7. 26.53N 100.18E lgt. S.Becvar

1992". Paratypes: 2 exs. (♂ + ♀) labelled as holotype (NMW, CASS). 4 exs. (♂♂ + ♀♀): "China: NW-Yunnan, 15 km N Lijiang, 2800 m, 6.VII.1994, leg. Ji (16)" (CWBS loc. 60); 1 ♀: same locality data, leg. Schillhammer (CWBS loc. 60; NMW).

DIAGNOSIS: 8.5 - 9.0 mm. Body outline oval, convex. Head black, densely covered with coarse punctation; lateral margins of clypeus brightened; maxillary palpi slender, dark brown. Pronotum densely and evenly covered with coarser punctures; disc black, sides narrowly brownish; lateral margins serrate, particularly in anterior half, pronotum finely margined. Elytra brown (seldom black), with darker patches irregularly distributed (EI 1.17); elytral striae well impressed, intervals slightly convex; primary punctation umbilicate, coarser punctures on alternate interstices distinct; lateral margins of elytra serrate. Underside black. Mentum and submentum rugulosely punctate. Prosternum strongly convex in middle, slightly keeled longitudinally, with only small antero-medial, tooth-like projection. Mesosternum with high, somewhat blunt, transverse protuberance posteriorly. Metasternum with glabrous, longitudinal protuberance pointing antero-medially between mesocoxae, followed by a shallow Λ -shaped concavity. Fifth sternite with distinct emargination on hind margin.

Aedeagus (Fig. 13): Similar to *H. baoshanensis*. Parameres more strongly narrowed apically and slightly curved inward; projection on inner surface of paramere rounded apically, slightly curved.

This species can be distinguished from related species by the larger average size, the dense, coarse punctation of the pronotum, the usually brown elytra, the convex elytral interstices and the different shape of the aedeagus.

DISTRIBUTION (Fig. 21): So far known only from the type locality.

Ametor SEMENOV, 1900

Ametor SEMENOV 1900: 614. - KNISCH 1924a, d'ORCHY-MONT 1928, 1942. LEECH & CHANDLER 1956. SPANGLER 1962. MILLER 1965. SMETANA 1988. HANSEN 1991.

TYPE SPECIES: *Ametor rudesculptus* SEMENOV 1900: 616 (fixed by monotypy).

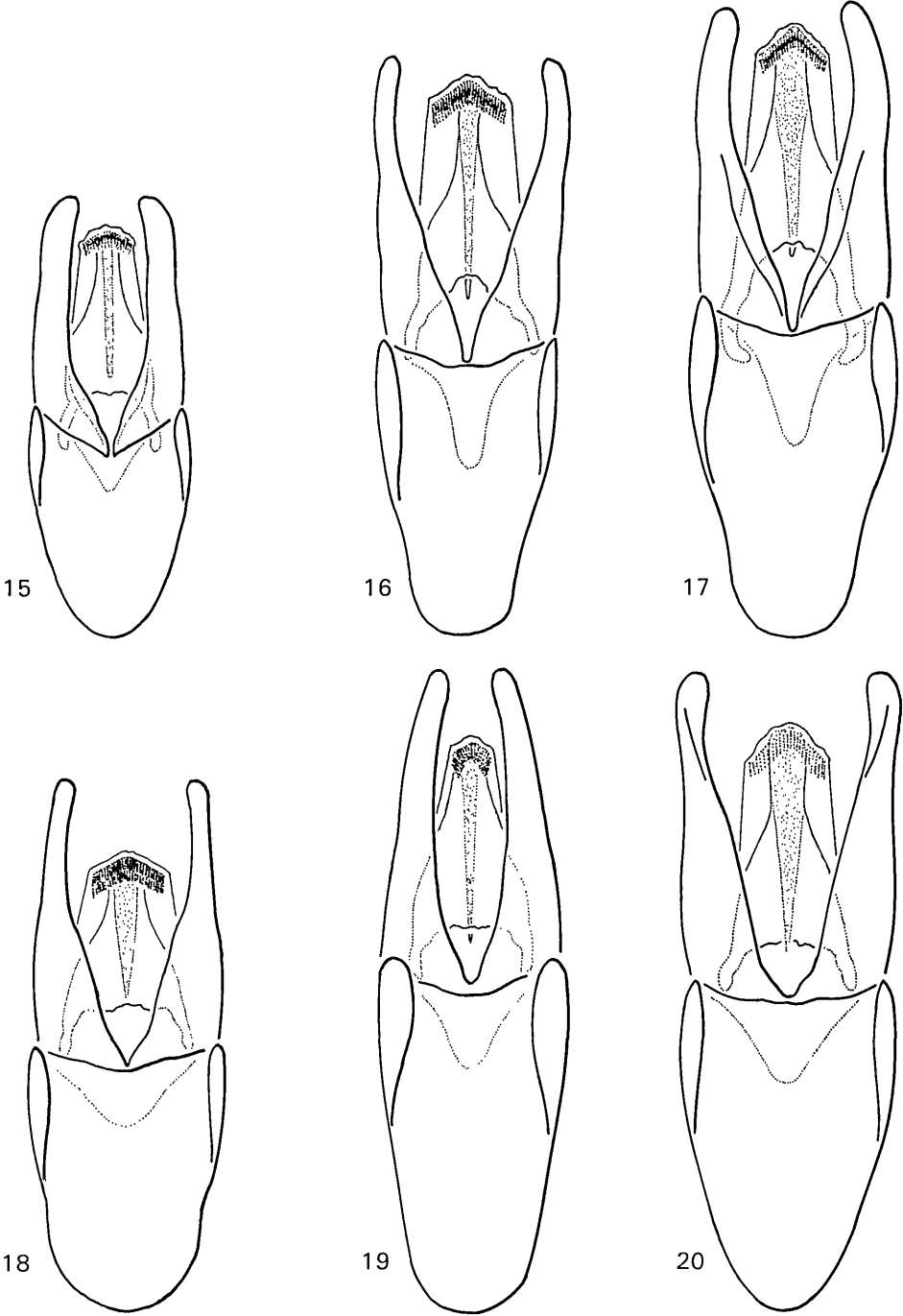
The genus *Ametor* without question is closely related to *Hydrocassis*. As external features for separation are poor, the genus is treated here as a paraphyletic taxon ranked equally with *Hydrocassis*.

Small to moderate sized (3.8 - 9.0 mm), depressed to moderately convex.

Body outline elongate to broadly oval, outline slightly to strongly interrupted between pronotum and elytra; dorsal surface dull and rugulosely sculptured to glabrous and smooth, brown to black; ventral side covered with dense hydrofuge pubescence. Head and pronotum densely punctate or rugulose. Pronotum usually not narrowed strongly anteriorly, hind angles usually narrowly to broadly rounded, lateral margins strongly crenulate, serrate or smooth. Elytra elongate, sometimes slightly elevated in distal half, sometimes sides in basal half slightly concave (not so in *A. latus*); elytral interstices with or without distinct primary punctures, with or without series of coarser punctures; these not always confined to alternate intervals; interstices between punctures smooth to rugulose, often microsculptured; margins of elytra slightly to strongly serrate (EI 1.23 - 1.33).

Prosternum as in *Hydrocassis*. Mesosternum with distinct, transverse protuberance posteriorly, but lower than in *Hydrocassis*, shape of metasternum similar to that in *Hydrocassis*.

Aedeagus: Median lobe broad, with lateral appendages (which often are seen only after treatment with lactic acid), its apex blunt. It can be distinguished easily from *Hydrocassis* by the corona which is always situated on the apex of the median lobe.



Figs. 15 - 20: Aedeagus of 15) *Ametor scabrosus*; 16) *A. rugosus*, specimen from Nepal; 17) *A. rugosus*, specimen from Sichuan; 18) *A. latus*; 19) *A. rudesculptus*, lectotype; 20) *A. rudesculptus*, specimen from Nepal (parameres diverged after excessive treatment with lactic acid).

Distribution: *Ametor* is so far known from western North America, Central Asia, the Himalaya, China and the Russian Far East.

Habitat: The species of *Ametor* are rare and seem to be especially abundant in cold, fast running streams and rivers amongst gravel and on submerged wood.

I. *Ametor rugosus* group

Represented by only one species.

***Ametor rugosus* (KNISCH)**

Hydrocylus rugosus KNISCH 1924b: 32.

Ametor rugosus (KNISCH): d'ORCHYMONT 1928: 97 (synonymy).

Hydrocassis rugosa (KNISCH): d'ORCHYMONT 1942: 16 (synonymy).

Hydrocassis rufrena d'ORCHYMONT 1942: 15 (= syn.n.). - SATÔ 1977.

TYPE LOCALITY: Kumaon, Uttar Pradesh, India.

TYPE MATERIAL: Lectotype ♂ (by present designation): "W. Almora, Kumaon, India. H.G.C. \ Type H.T. \ Knisch det 1922 *Hydrocylus rugosus* m. \ *Hydrocylus rugosus* Knisch \ det. Knisch W.E.Z. 1924 \ G.C. Champion. Brit. Mus. 1925-42." (BML). Paralectotypes (examined): 4 specimens with same locality data in the BML and ISNB: 2 specimens "S. Garhwal, Kumaon 6500ft. India H.G.C." in the BML and ISNB. Further topotypes from Kumaon, in the BML.

SYNONYMS: We have examined the holotype ♀ of *Hydrocassis rufrena* "Coll.R.I.Sc.N.B., Sikkim: ex Staudiger [sic] Sikkim, India, Coll.A.d'Orchymont \ A.d'Orchymont det. *Hydrocassis rufrena* m. \ TYPE" and one paratype ♀, "Coll.R.I.Sc.N.B. Annandale Near Ghoom, E. Himalayas ca. 7000 ft. 16 IV. 11., Coll. d'Orchmont \ A.d'Orchymont det. *Hydrocassis rufrena* m. \ Paratype", both deposited in the ISNB. One paratype from Kurseong [= Karsiyang] which, according to the original description, should be deposited in the Indian Museum Calcutta, could not be examined. Two additional specimens (topotypes, Kurseong), deposited in the MHNP (Coll. Régimbart), agree very well with the type material. At first sight there seem to be great differences from typical material of *Ametor rugosus* in the considerably coarser punctures on the pronotum and elytral intervals of the latter. After examination of a considerable number of specimens of *H. rufrena* from various populations and as this species is rather variable, *H. rufrena* must be considered a synonym of *A. rugosus*. In addition, we could not find any aedeagal differences.

DIAGNOSIS: 6.5 - 9.0 mm. Variable and widespread species. The fact that it has been described twice, once as *Ametor*, once as *Hydrocassis*, indicates the great variability of this species.

Body markedly convex with smooth elytra, or more typically "*Ametor*-like", flatter with a more rugose surface. Head densely and evenly covered with coarser punctures; maxillary palpi slender (unusual for *Ametor*), reddish brown; mentum densely and coarsely punctate, submentum only laterally so. Pronotum evenly and densely covered with coarse punctures, somewhat rugulose near lateral margins; lateral margins finely serrate, reddish, narrowly so in anterior half, broadly in posterior half; anterior margin and sides finely margined, base only inconspicuously so; hind angles narrowly rounded. Elytra elongate (El 1.23), slightly to considerably convex, smooth between coarser punctures; distinct coarser punctures on alternate interstices or, as in several specimens, on all intervals; lateral margins distinctly serrate; epipleura finely and densely umbilicately punctate, oblique in posterior half but horizontal in anterior half. Mesosternum postero-medially with an angulate, transverse protuberance, lower than in *Hydrocassis*, followed by a robust prominent longitudinal keel. Metasternum with only a shallow Λ -shaped cavity antero-medially. Fifth sternite with distinct emargination on posterior margin. Pilosity of femora $> 1/2$, smooth distal portion with few fine setiferous punctures.

Aedeagus (Fig. 16, 17): Parameres slender, slightly curved, narrowed in distal half, apically rounded; corona on apex of median lobe; median lobe only slightly shorter than parameres.

Specimens from Nepal and Yunnan resemble typical "*Hydrocassis rufrena*" and differ from the types of *Hydrocylus rugosus* in the smaller average body size, in the less elongate body outline and in the darker colour. As the aedeagi are identical, these differences are due to variability.

DISTRIBUTION (Fig. 22): Typical Himalayan element: India (Himachal Pradesh, northern Uttar Pradesh, northern West Bengal, Sikkim), Bhutan (Thimphu (SATÔ 1977)), China (Yunnan, Sichuan, Tibet).

ADDITIONAL MATERIAL EXAMINED:

I N D I A: HIMACHAL PRADESH: Gahan, Simla Hills, 25.IX.1921 (ISNB). UTTAR PRADESH: Chakrata Dist., Khedar Khud 7500', Chatterjee, 7.V.22. (ISNB). WEST BENGAL: "Kurseong" [= Karsyang] (MHNP).
N E P A L: Tatopani, Nepal-Tibet border (N29, N31), 27.2./I.III.1981. leg. Jäch (NMW); 35 km NW Pokhara (N4), Ulleri, 2000 m, 5.5.1984, leg. Wewalka (NMW); Basantpur, 18.VI.1972, leg. Makihara (WUN); Chitorei, 16.VI.1972, leg. Makihara (WUN); Nungarpa, Sindhu, 2000 m, 11.XI.1979, leg. Satô (WUN, NMW); Balko, Dhankuta, 2450 m, 1.XI.1979, leg. Satô (WUN, NMW).
C H I N A: YÜNNAN: 100 km W Baoshan, Gaoligongshan Nat. Res., 14.-21.6.1993, leg. Jendek & Sausa (NMW); Daju, 50 km N of Lijiang, 21.-28.VI.1992, leg. Becvar (NMW, CASS). SICHUAN: Shimian, 1.V.1992 (NMW, CASS); Liziping, 25 km S Shimian, ca. 1000 m, 1.-3.V.1993, leg. Yang & Ji (NMW, CASS). TIBET: Tatopani, Nepal-Tibet border (N29, N31), 27.2./I.III.1981. leg. Jäch (NMW).

II. *Ametor rudesculptus* group

Ametor (sensu HANSEN 1991)

Two species are placed in this group, *Ametor rudesculptus* and *A. scabrosus*. Both represent the typical "*Ametor*-like" habitus with an elongate body outline, markedly interrupted between pronotum and elytra, the elytra only slightly convex, the dorsal surface sculptured or rugulose punctate and the epipleura almost horizontal.

Ametor rudesculptus SEMENOV

Ametor rudesculptus SEMENOV 1900: 617. - d'ORCHYMONT 1942: 18. SILFVERBERG 1987. HANSEN 1991.

Ametor oberthuri d'ORCHYMONT 1942: 18 (= syn.n.).

Ametor wittmeri SATO 1977: 200 (= syn.n.).

TYPE LOCALITY: "Turkestan occidentali; Kschut: Artutsch" (SEMENOV 1900). There has been some confusion about the type locality of *A. rudesculptus* since d'ORCHYMONT (1942) interpreted "Artutsch" as "Artouch, Altyn Artych" [= Artux, now called Atushi, near Kashi (= Kashgar), Xinjiang, western China], but the information on the labels of the types (see below) and the original description (see above) clearly indicate that the type locality is a small village named Artutsh (ca. 2400 m a.s.l.), south of Pendzhikent, Zeravshan Mountains, N Tadzhikistan.

TYPE MATERIAL: Lectotype ♂ (by present designation): "Ametor typ. rudesculptus Sem \ SERAVSHAN KSCHTUT. ARTUTSCH Glasunov 1892. \ Zool.Mus.Helsinki Loan No. C-87 859 \ Mus.Zool.Helsinki Loan No. C - 95 1" (ZMH). 1 Paralectotype ♂ with identical locality data \ "Ametor rudesculptus Semen. det. Ph. Zaicev [!sic]" (MHNP). According to the original description there are 7 additional syntypes, the depository of which is unknown.

SYNONYMS: Two paratypes (♂ + ♀) of *Ametor oberthuri*, described from Sikkim (ISNB) "Coll.R.I.Sc.N.B., Sikkim: coll.Oberthuri Sikkim Gnatong Août 1901, coll. d'Orchymont \ A.d'Orchymont det. Ametor oberthuri m. \ Paratype" have been examined. Erroneously d'ORCHYMONT (1942) cited the type locality as "Onatong". The aedeagus and the external characters are identical with those of *Ametor rudesculptus*.

The holotype ♂ of *Ametor wittmeri*, "Thimphu 16/4 \ Nat.-Hist. Museum Basel - Bhutan Expedition 1972 \ Holotype *Ametor wittmeri* M. Satô DET. M. SATO 1976" and four paratypes (1 ♂ [aedeagus missing] labelled as holotype (NMB), 1 ♂, same data (WUN), and 2 ♀♀, "20 km S Thimphu 18/5 \ Nat.-Hist. Museum Basel - Bhutan Expedition 1972 \ Paratype *Ametor wittmeri* M. Satô DET. M. SATO 1976" (NMB)) have been examined. Pronotum with shallow impressions, body slightly broader and the lateral margins of the elytra more strongly crenulate. All other features and the aedeagus identical with that of *A. rudesculpus*.

DIAGNOSIS: Habitus (Fig. 14). 7.5 - 9.5 mm. Black, dull, depressed. Head and pronotum with dense, fine punctation, intermixed with coarser punctures. Maxillary palpi somewhat stout, reddish brown; mentum rugulosely punctate. Lateral margins of pronotum strongly serrate, posterior half less rugulose between punctures, sometimes with shallow transverse impressions near base; basal corners broadly angulate to broadly rounded; pronotum finely margined. Elytra elongate (El 1.33), intervals rugulosely punctate, with fine microsculpture; alternate intervals with a longitudinal series of vague impressions; margins inconspicuously to distinctly serrate, lateral sides in anterior half with slight concavity; epipleura finely punctate, with fine microsculpture, pseudopipleura strongly narrowed. Prosternum carinate medially, interrupted by a transverse impression; posterior part of carina accompanied laterally by two short ridges. Mesosternum with a blunt, transverse, postero-median elevation. Metasternum raised medially, transversely impressed behind mesocoxae. Hind margin of 5th sternite with distinct emargination. Pilosity covering more than 1/2 of femora.

Aedeagus (Fig. 19): Parameres evenly curved towards apex, gradually narrowed; median lobe as in *A. rugosus*, gradually widened to base, considerably shorter than parameres.

DISTRIBUTION (Fig. 22): Northern Tadjikistan, Nepal, India (Sikkim), China (Yunnan, Tibet, Sichuan).

ADDITIONAL MATERIAL EXAMINED:

CHINA: YUNNAN: Heishui, 35 km N Lijiang, 27°13'N 100°19'E, 1.-19.VII.1992, leg. Jendek (NMW). SICHUAN: Zhangla env., 4200-4700 m, 9.-11.VII.1991, leg. Kaláb (NMW); Shimian, 1.V.1992 (NMW, CASS); Liziping, 25 km S Shimian, ca. 1000 m, 1.-3.V.1993, leg. Yang & Ji (NMW). **TIBET:** Tatopani, Nepal-Tibet border (N31), 1.III.1991, leg. Jäch (NMW).

NEPAL: Himalaya, Annapurna Mts., Sikles NE Pokhara, 2000 m, 15.V.1993, leg. Schmidt (MNS); Tatopani, Nepal-Tibet border (N31), 1.III.1991, leg. Jäch (NMW); Phakding, Solukhumbu, 29.IX.1979, leg. Satô (WUN, NMW); Solukhumbu, Sanam, Share Drangka, 7.IV.1994, leg. Sharma (NMW).

Ametor scabrosus (HORN)

Hydrobius scabrosus HORN 1873: 133. - KNISCH 1924a. RICHMOND 1920 (biology).

Sperchopsis scabrosus: d'ORCHYMONT 1928: 93 (synonymy).

Ametor scabrosus: d'ORCHYMONT 1942 (synonymy). - LEECH & CHANDLER 1956. SPANGLER 1962 (description of larva and pupa). MILLER 1965. SMETANA 1988. HANSEN 1991.

Ametor scabrosus var. *granulosus* d'ORCHYMONT 1942: 19 (= syn.n.).

Hydrocassis lucifer SHATROVSKIY 1989: 289 (= syn.n.). - SHATROVSKIY 1992.

TYPE LOCALITY: "Northern California, Oregon and Vancouver (HORN 1873).

TYPE MATERIAL: We have not seen the types, but material deposited in ISNB which fits very well with the original description, has been examined.

SYNONYMS: We have seen two paratypes of *Ametor scabrosus* var. *granulosus* d'ORCHYMONT "Coll.R.I.Sc.N.B. Usa-Californie Alameda Co. Cal. Coll. Rivers coll. d'Orchymont / Stries juxta Scutellaires absentes / *Hydrobius scabrosus* - *granulosus* nov. var. COTYPE / Paratype" (ISNB); "Coll.R.I.Sc.N.B. Usa-Californie Californien Rivers coll. d'Orchymont / Stries juxta Scutellaires absentes / *Hydrobius scabrosus* - *granulosus* nov. var. COTYPE / Paratype" (ISNB). The punctures

on the elytral intervals are a little more granulate in "*granulosus*", but there are no significant external differences.

The type material of *Hydrocassis lucifer*, described from Russia (Primorye), was not studied. Differences from *A. scabrosus* are the slightly more convex elytral interstices and the slightly coarser granulation on the pronotum and the elytra. Based on the illustration of the aedeagus and the original description of *H. lucifer* and comparison with material from Russia, China and the United States, *H. lucifer* is regarded here as a junior synonym of *Ametor scabrosus*. The slight differences most likely are due to variability.

DIAGNOSIS: Small species (3.8 - 6.5 mm). Head finely punctate, microreticulate, sometimes punctures umbilicate, surface glabrous. Maxillary palpi stout; mentum finely punctate, glabrous between punctures. Pronotum with dense, fine, umbilicate punctation, intermixed with coarser punctures, surface between punctures with fine reticulation; hind angles broadly rounded. Elytra elongate (EI 1.33), gradually widened towards apex, suture slightly elevated; interstices moderately convex with fine, umbilicate to rugulose punctation, smooth or finely reticulate between punctures; 5th and 6th intervals raised considerably in posterior half, sometimes forming a low, elongate tubercle; 11th interval ridge-like, concealing lateral margins at least in posterior half; margins of elytra finely serrate; epipleura with fine punctures, horizontal. Prosternum sharply longitudinally keeled; keel interrupted by a distinct transverse impression. Mesosternum postero-medially with a sharp transverse protuberance. Metasternum short, Δ -shaped antero-medially behind mesocoxae. Hind margin of 5th sternite evenly rounded, without emargination. Femora with hydrofuge pubescence only basally, covering no more than one-third of their length; remaining area finely to strongly reticulate or shagreened.

Aedeagus: (Fig. 15). Parameres almost straight, flattened in apical half, slightly bent towards middle. Median lobe with corona rather broadly rounded, gradually widened to the base.

DISTRIBUTION (Fig. 22): China (Jilin), Russian Far East (Primorye, Khabarovsk), USA (California, Utah, Wyoming, Oregon), Canada (Brit. Columbia, Alberta).

ADDITIONAL MATERIAL EXAMINED:

R U S S I A: Khabarovsk Province, Bolshe-Khehtsyrsky Reserve, 400-450 m, 6.-10.VI.1990, leg. Schawaller (MNS).

C H I N A: JILIN: Changbai Shan, Erdaobaihe, 750 m, 15.VI.1992, leg. Yang & Ji (NMW). CWBS loc. 70.

C A N A D A: BRITISH COLUMBIA: Spious Creek, 30.V.1921, leg. Hopping (ISNB); Metlakatla (ISNB); Wynndel, 18.VII.1931, leg. Stace Smith (ISNB).

U S A: CALIFORNIA: Alameda (ISNB). UTAH: "City Can 16 6 Ut Coll Hubbard & Schwarz" (ISNB). WYOMING: "Nat Pk" [= Yellowstone Nat. Park, cf. SPANGLER 1962] (ISNB).

III. *Ametor latus* group

This group is represented by one species, so far known from North America only.

Ametor latus (HORN)

Hydrobius latus HORN 1873: 133. - KNISCH 1924a.

Ametor latus (HORN): LEECH & CHANDLER 1956. MILLER 1965. SMETANA 1988.

TYPE LOCALITY: Fort Crook, California, USA.

TYPE MATERIAL: We have not seen the type material, but specimens deposited in the ISNB (det. Leech, det. Spangler) and NMW have been examined.

DIAGNOSIS: 5.8 - 6.7 mm long, brown to dark brown, glabrous. Body outline broadly oval, moderately convex. Head densely covered with fine, and sparsely covered with coarser punctures; maxillary palpi slender. Pronotum densely and evenly covered with fine primary punctures, and

somewhat more irregularly dispersed coarser punctures; primary punctures on sides umbilicate, surface somewhat more rugulose; lateral margins of pronotum not serrate, anterior and lateral margins finely margined; hind angles broadly rounded. Elytra evenly convex, striae moderately deeply impressed, interstices slightly convex, densely covered with fine punctures which are umbilicate or rugulosely punctate; interstices with only few inconspicuously impressed coarser punctures; surface between punctures smooth; lateral margins only slightly serrate. Prosternum slightly longitudinally keeled anteriorly in front of a shallow transverse impression. Mesosternum with low, sharp transverse elevation posteriorly. Metasternum raised antero-medially between mesocoxae. Hydrofuge pubescence on femora extending to about midlength. Hind margin of 5th sternite with shallow emargination.

Aedeagus (Fig. 18): Parameres distinctly and abruptly narrowed in apical half, slightly bent; median lobe distinctly shorter than in other species (the illustration in SMETANA 1988 does not show the lateral appendages of the median lobe clearly).

DISTRIBUTION: So far known only from western North America.

ADDITIONAL MATERIAL EXAMINED:

C A N A D A: BRITISH COLUMBIA: Creston, Goat River, 3.IX.1945, leg. Stace Smith (ISNB).

U S A: CALIFORNIA: "Calif", 1874, leg. Steindachner (NMW). MONTANA: Bear Paw Mountains, Coll. Hubbard & Schwarz (ISNB).

Zusammenfassung

Die Systematik und Taxonomie der Arten der Gattungen *Hydrocassis* und *Ametor* werden behandelt. Die Gattungen werden - mit Vorbehalt - getrennt behandelt, da zwei Arten nach äußeren Merkmalen nicht eindeutig zuzuordnen sind. Zur Klärung der tatsächlichen Verwandtschaftsverhältnisse sind weitere phylogenetische Studien nötig. Neun Arten werden in der Gattung *Hydrocassis* besprochen und anhand von Merkmalen des Aedaeagus in drei Artengruppen zusammengefaßt. Drei neue Arten, alle aus Yünnan, werden beschrieben: *Hydrocassis baoshanensis* sp.n., *H. metasternalis* sp.n. und *H. schillhammeri* sp.n. Für *Hydrocycylus imperialis* KNISCH wird ein Neotypus festgelegt. Die vier bisher in der Gattung *Ametor* zusammengefaßten Arten werden in drei Artengruppen behandelt. Lectotypen werden für *Ametor rudesculptus* SEMENOV und *Hydrocycylus rugosus* KNISCH festgelegt. Folgende neue Kombinationen und Synonymien werden errichtet: *Hydrocassis scapha* d'ORCHYMONT (= *H. vietnamica* SATÔ syn.n.), *Ametor scabrosus* (= *A. lucifer* (SHATROVSKIY) syn.n. et comb.n.), *A. rudesculptus* SEMENOV (= *A. oberthuri* d'ORCHYMONT syn.n., = *A. witmeri* SATÔ syn.n.), *Ametor rugosus* (KNISCH) (= *Ametor rufrenus* (d'ORCHYMONT) syn.n. et comb.n.). Die Aedacagi aller Arten sind abgebildet. Bestimmungsschlüssel zu den Gattungen, Artengruppen und Arten sowie Verbreitungskarten sind inkludiert.

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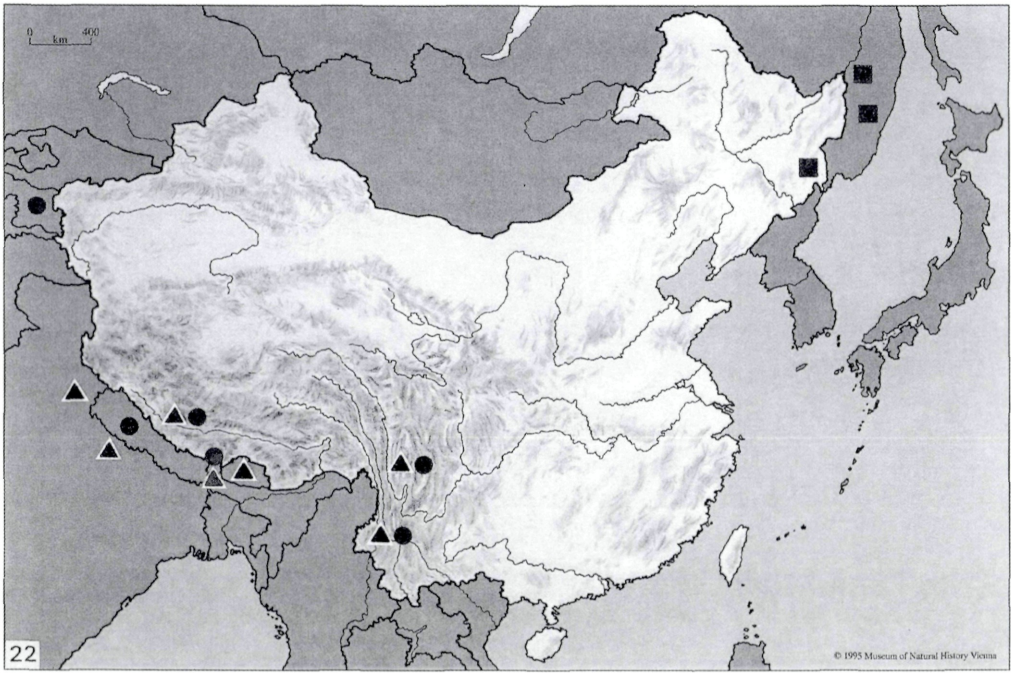
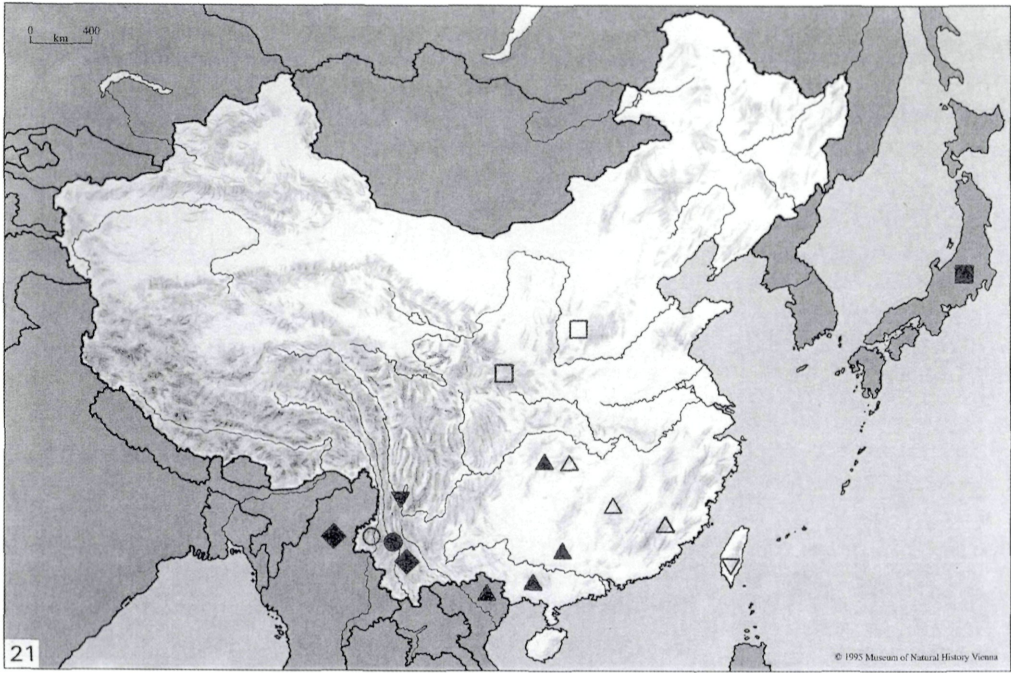


Fig. 21: Distribution of *Hydrocassis* spp.: *Hydrocassis imperialis* (△), *H. scapha* (▲), *H. lacustris* (■), *H. metasternalis* (○), *H. scapulata* (□), *H. taiwana* (▽), *H. baoshanensis* (●), *H. scaphoides* (◆), *H. schillhammeri* (▼).

Fig. 22: Distribution of *Ametor* spp.: *Ametor rugosus* (▲), *A. rudesculptus* (●), *A. scabrosus* (■).

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