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DYTISCIDAE: V. Taxonomic and distributional notes on *Hygrotus* STEPHENS, with emphasis on the Chinese fauna and a key to the Palearctic species

(Coleoptera)

H. FERY

Abstract

Taxonomic and distributional notes on *Hygrotus* STEPHENS (Coleoptera: Dytiscidae) are provided. *Hygrotus zigetangco* sp.n. is described from Tibet. Synonymies are proposed as follows: *Coelambus trilineatus* FENG, 1936 = *Hygrotus caspius* (WEHNCKE, 1875), *Coelambus distinctus* FENG, 1936 = *Hygrotus parallellogrammus* (AHRENS, 1812), *Coelambus uzbekorum* ZAITZEV, 1953 = *Hygrotus inscriptus* (SHARP, 1882), *Hygrotus alei* ABDUL-KARIM & ALI, 1986 = *Herophydrus musicus* (KLUG, 1834). The synonymy of *Coelambus reitteri* ZAITZEV, 1908 with *Hygrotus caspius* (WEHNCKE, 1875) is confirmed. The following subspecific names are treated as junior subjective synonyms of the respective nominotypical subspecies: *Coelambus impressopunctatus roborovskii* ZAITZEV, 1953, *Coelambus impressopunctatus hiurai* SATÔ, 1972, and *Hygrotus inaequalis hokkaidensis* SATÔ, 1972. *Hygrotus polonicus sahlbergi* (SHARP, 1882) is reintroduced as a subspecies of *Hygrotus polonicus* (AUBÉ, 1842). The record of *Hygrotus confluens* (FABRICIUS, 1787) from China (KAMIYA 1940: 119) is found to be a misidentification of *H. caspius*. Thus at present, 14 species of *Hygrotus* are known to occur in China. A key to all 30 known Palearctic *Hygrotus* is presented, and their male and female genitalia are figured, most of them for the first time. Lectotypes are designated for *Hydroporus polonicus* AUBÉ, 1842, *Hydroporus mulsanti* PEYRON, 1858, *Hydroporus flaviventris* MOTSCHULSKY, 1860, *Hydrocoptus mixtus* MOTSCHULSKY, 1860, *Hydroporus caspius* WEHNCKE, 1875, *Coelambus unguicularis* SAHLBERG, 1880, *Coelambus chinensis* SHARP, 1882, *Coelambus vittatus* SHARP, 1884, *Coelambus awajewi* JAKOVLEV, 1899, *Coelambus urgensis* JAKOVLEV, 1899, *Coelambus reitteri* ZAITZEV, 1908, *Hydroporus lutzi* REITTER, 1908, *Hygrotus aequalis* FALKENSTRÖM, 1932, and *Coelambus impressopunctatus roborovskii* ZAITZEV, 1953. Several new distributional records are presented: *Hygrotus chinensis* (SHARP, 1882): North Korea; *Hygrotus confluens* (FABRICIUS, 1787): Pakistan, Kazakhstan; *Hygrotus enneagrammus* (AHRENS, 1833): Afghanistan, Tajikistan, Uzbekistan, Turkmenistan, Iraq; *Hygrotus flaviventris* (MOTSCHULSKY, 1860): Pakistan, Kyrgyzstan, Turkmenistan; *Hygrotus impressopunctatus* (SCHALLER, 1783): Pakistan, Afghanistan, Kyrgyzstan, Tajikistan, Uzbekistan, Moldavia, Romania; *Hygrotus inscriptus*: Turkmenistan; *Hygrotus marklini* (GYLLENHAL, 1813): Turkmenistan, Estonia; *Hygrotus pallidulus* (AUBÉ, 1850): Turkmenistan; *Hygrotus parallellogrammus* (AHRENS, 1812): Mongolia, Kyrgyzstan, Uzbekistan, Turkmenistan, Estonia; *Hygrotus polonicus polonicus* (AUBÉ, 1842): Kazakhstan, Ukraine; *Hygrotus unguicularis* (CROTCH, 1874): European Russia.

Key words: Coleoptera, Dytiscidae, *Hygrotus*, *Coelambus*, *Herophydrus*, new species, lectotypes, new synonymies, faunistics, China.

Introduction

In the first volume of the "Water Beetles of China" (JÄCH & JI 1995a) NILSSON (1995) published a check list of Chinese Noteridae and Dytiscidae, including all 16 *Hygrotus* STEPHENS, 1828, hitherto known from this country. In the present work not all of these are investigated thoroughly. Besides the description of *Hygrotus zigetangco* sp.n. only those species are treated of which new material or any detail of special interest have become available. Records which have already been presented in previous works (FERY 1992, 1995) are mentioned only exceptionally. In some cases the opportunity has been taken to add some records from regions bordering China: Mongolia, Korea, Pakistan, Afghanistan, Russia, etc. This helps our understanding of the overall distribution of the respective species.

Material and methods

Comments in square brackets are those of the present author. Numbers in braces {} added to the type material and additional material of *H. caspius* refer to those in the map (Fig. 178).

Distributional data are provided only for China, and adjacent countries; more information on distribution is given in NILSSON (2002). Some problems are caused by the use of geographical terms as "China: Mongolia" (FENG 1933a: 23, 24), and "Manchuria" or "Manchoukuo" (e.g. KAMIYA 1940: 118, 119) (see NILSSON 1995: 36). In the present work I give these terms in parenthesis. For CWBS localities cited in the present work see JÄCH & JI (1995b, 1998). Specifications of localities are taken from "Andrees Handatlas, 1890", "Stiehlers Handatlas, 1928/30", "The Times Atlas of the World, 1997", "Microsoft Encarta World Atlas, 2000", ZHAO & ADLER (1993) and SCHÜTZE & KLEINFELD (1997). Most Mongolian localities are taken from the "Gazetteer of Mongolia, 1988", and the "Physical Map of Mongolia, 1995". For the presentation of the coordinates of several localities I have adopted the style of "The Times Atlas". For localities which are marked with an asterisk [*] detailed information is given in the "Appendix", where the reader also finds explanations of several German label texts.

All lectotype designations in the present work are made in order to support the stability of the nomenclature.

Acronyms:

AUB	American University of Beirut, Lebanon (Dr. A.S. Talhouk, Dr. K. Knio)
BML	The Natural History Museum, London, UK (S. Hine) [formerly: British Museum (Natural History)]
CAN	coll. Dr. A.N. Nilsson, Umeå, Sweden
CAP	coll. A. Pütz, Eisenhüttenstadt, Germany
CBSU	Department of Biology, Shiraz University, Iran (Dr. S. Hosseinie)
CEM	coll. E. Matsui, Arao City, Japan
CFP	coll. F. Pederzani, Ravenna, Italy
CGW	coll. Dr. G. Wewalka, Vienna, Austria
CHF	coll. Dr. H. Fery, Berlin, Germany, property of the NMW
CHH	coll. H. Hebauer, Rain, Germany
CJB	coll. J. Bergsten, Umeå, Sweden
CJH	coll. J. Hájek, Praha, Czech Republic
CJS	coll. J. Šťastný, Liberec, Czech Republic
CKD	coll. Dr. K. Dettner, Bayreuth, Germany
CLH	coll. Dr. L. Hendrich, Berlin, Germany
CMB	coll. Dr. M. Balke, Berlin, Germany
CMT	coll. M. Toledo, Brescia, Italy
CPM	coll. Dr. P. Mazzoldi, Brescia, Italy
CRA	coll. Dr. R. Angus, Surrey, UK
CWBS	China Water Beetle Survey
DEI	Deutsches Entomologisches Institut, Eberswalde, Germany (Dr. L. Zerche)
HNHM	Hungarian Natural History Museum, Budapest, Hungary (Dr. G. Szél, Dr. O. Merkl)

IRSN Institut Royal des Sciences Naturelles de Belgique, Brussels, Belgium (M. Cludts, Dr. K. Desender)
MMB Moravian Museum in Brno, Czech Republic (Dr. J. Kolibáç)
MNB Museum für Naturkunde, Humboldt-Universität, Berlin, Germany (Dr. F. Hieke, Dr. M. Uhlig, B. Jaeger)
MNE Museum für Naturkunde, Erfurt, Germany (M. Hartmann)
MNHN Muséum National d'Histoire Naturelle, Paris, France (Dr. H. Perrin)
MRTO Museo Regionale di Scienze Naturali, Torino, Italy (Dr. M. Daccordi)
MZL Museum of Zoology Lund University, Lund, Sweden (Dr. R. Danielsson)
NHMP National History Museum, Praha, Czech Republic (Dr. J. Jelínek, J. Hájek)
NMB coll. Dr. M. Brancucci, deposited in the Naturhistorisches Museum Basel, Switzerland
NMW Naturhistorisches Museum Wien, Austria (Dr. M.A. Jäch)
NRM Naturhistoriska Riksmuseet, Stockholm, Sweden (B. Viklund)
OLML Oberösterreichisches Landesmuseum, Linz, Austria (Mag. F. Gusenleitner)
SMNS Staatliches Museum für Naturkunde, Stuttgart, Germany (Dr. W. Schawaller)
SMTD Staatliches Museum für Tierkunde, Dresden, Germany (O. Jäger)
ZISP Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia (Dr. B. Katajev)
ZMH Zoological Museum Helsinki, Finland (Dr. O. Biström)
ZMUM Zoological Museum, Lomonosov State University, Moscow, Russia (Dr. N. Nikitsky, P. Petrov)
ZSM Zoologische Staatssammlung, München, Germany (Dr. M. Baehr, M. Kühbandner)

hw (handwriting)
MW (maximum width)
TL (total length)

Systematics

NILSSON (2001) listed 12 species of *Hygrotus* s.str. and 61 species of *Coelambus* world-wide, of these, six and 27 respectively, belong to the Palearctic fauna. However, mainly due to the synonymies in the present work only five species of *Hygrotus* s.str. and 25 species of *Coelambus* can be recognised in the Palearctic Region, and of these, three and 11 respectively, are known from China.

Check list of the Palearctic *Hygrotus* STEPHENS

The following check list includes all Palearctic species of the subgenera *Hygrotus* s.str. and *Coelambus*, each in alphabetic order. Species which have been recorded from China are given in bold type.

Hygrotus s.str. STEPHENS, 1828

1. *aequalis* FALKENSTRÖM, 1932
2. *decoratus* (GYLLENHAL, 1810)
3. *inaequalis* (FABRICIUS, 1776)
4. *quinquelineatus* (ZETTERSTEDT, 1828)
5. *versicolor* (SCHALLER, 1783)

Coelambus THOMSON, 1860

1. *armeniacus* (ZAITZEV, 1927)
2. *caspius* (WEHNCKE, 1875)
3. *chinensis* (SHARP, 1882)
4. *confluens* (FABRICIUS, 1787)
5. *corpulentus* (SCHAUM, 1864)
6. *enneagrammus* (AHRENS, 1833)
7. *flaviventris* (MOTSCHULSKY, 1860)
8. *fresnedai* (FERY, 1992)
9. *impressopunctatus* (SCHALLER, 1783)
10. *inscriptus* (SHARP, 1882)
11. *lagari* (FERY, 1992)
12. *lernaeus* (SCHAUM, 1857)
13. *marklini* (GYLLENHAL, 1813)
14. *nigrolineatus* (STEVEN, 1808)
15. *novemlineatus* (STEPHENS, 1829)
16. *pallidulus* (AUBÉ, 1850)
17. *parallellogrammus* (AHRENS, 1812)
18. *pectoralis* (MOTSCHULSKY, 1860)
19a. *polonicus polonicus* (AUBÉ, 1842)
19b. *polonicus sahlbergi* (SHARP, 1882)
20. *saginatus* (SCHAUM, 1857)
21. *sanfilippoi* (FERY, 1992)
22. *semenowi* (JAKOVLEV, 1899)
23. *unguicularis* (CROTCH, 1874)
24. *urgensis* (JAKOVLEV, 1899)
25. *zigetangco* sp.n.

List of taxa which have been synonymised or removed from *Hygrotus*

The following list contains those taxa which have been given by NILSSON (1995) and/or NILSSON (2001) as valid species or subspecies, but subsequently recognised as junior subjective synonyms or as not belonging to *Hygrotus* either since these works or in the present one.

***Hygrotus* (s.str.) *alei* ABDUL-KARIM & ALI, 1986 (syn.n.)**

This taxon is proposed to be a synonym of *Herophydrus musicus* (KLUG, 1834). According to the original description the elytral pattern and in particular the shape of the aedeagus fit well those of *Herophydrus musicus*. Fig. 176 is a slightly modified reproduction of the aedeagus of *Hygrotus alei* as it is presented in ABDUL-KARIM & ALI (1986: 283). In Fig. 177, I have depicted the aedeagus of *Herophydrus musicus*, adapting the style of drawing of these authors, the similarity of both figures seems to me to be obvious.

***Hygrotus* (s.str.) *inaequalis hokkaidensis* SATÔ, 1972 (syn.n.)**

Recognised as synonym of *Hygrotus* (s.str.) *inaequalis* (FABRICIUS, 1776) in the present work.

***Hygrotus* (*Coelambus*) *discedens* (SHARP, 1882)**

This species has been transferred to the *tokui*-group of *Hydroporus* CLAIRVILLE, 1806, and was given the replacement name *Hydroporus hygrotoides* in FERY (2000: 1247).

***Hygrotus* (*Coelambus*) *distinctus* (FENG, 1936) (syn.n.)**

Recognised as synonym of *Hygrotus* (*Coelambus*) *parallellogrammus* (AHRENS, 1812) in the present work.

***Hygrotus* (*Coelambus*) *impressopunctatus hiurai* (SATÔ, 1972) (syn.n.)**

Recognised as synonym of *Hygrotus* (*Coelambus*) *impressopunctatus* (SCHALLER, 1783) in the present work.

***Hygrotus* (*Coelambus*) *impressopunctatus roborovskii* (ZAITZEV, 1953) (syn.n.)**

Recognised as synonym of *Hygrotus* (*Coelambus*) *impressopunctatus* (SCHALLER, 1783) in the present work.

***Hygrotus* (*Coelambus*) *trilineatus* (FENG, 1936) (syn.n.)**

Recognised as synonym of *Hygrotus* (*Coelambus*) *caspius* (WEHNCKE, 1875) in the present work.

***Hygrotus* (*Coelambus*) *uzbekorum* (ZAITZEV, 1953) (syn.n.)**

Recognised as synonym of *Hygrotus* (*Coelambus*) *inscriptus* (SHARP, 1882) in the present work.

Key to Palearctic species of *Hygrotus*

The following key to *Hygrotus* treats all 30 Palearctic species. In some parts of the key I follow that of NILSSON & HOLMEN (1995), in some others that of ZIMMERMANN (1930). The key is applicable to males and shiny females; for several matt females, however, the key may fail. In such cases, the reader may use the separate key to females of ZAITZEV (1953: 133). I recommend, however, to dissect such females and compare the genitalia with the figures provided in the present work.

It must be emphasised that in lateral view the shape of the median lobe's apex can be changed considerably in those species which have it strongly flattened: *H. pallidulus*, *H. flaviventris*, *H. enneagrammus*, *H. pectoralis*, and rarely also *H. confluens* and *H. caspius*. Additionally, it must be noted that the shape of the lobe can be changed depending on whether it is observed in liquid or whether it is dry (the lobes depicted in this work have been studied in liquid).

1 Anterior margin of clypeus with rim, which is complete in most species, but medially narrowed or almost interrupted in *H. aequalis* and some populations of *H. versicolor*; body shape globose (Fig. 164); inner side of elytra with carina, which is distinctly dilated before raised ligula (Figs. 172 - 174) (subgenus *Hygrotus* s.str.) 2

- Anterior margin of clypeus (in Palearctic species) without rim; body shape more elongate (only *H. confluens* almost globose); carina on inner side of elytra indistinctly dilated before strongly raised ligula (Figs. 169 - 171) (subgenus *Coelambus*) 6

2 Small species (2.2 - 2.6 mm); in lateral view epipleural rim only slightly ascending towards humeral angle; clypeal grooves weakly developed; elytra brown with diffusely delimited testaceous spots. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 14, 19, 24, 29 ..... ***decoratus***

- Larger species (3.0 mm or more); epipleural rim in lateral view more distinctly ascending towards humeral angle (Fig. 164); clypeal grooves well-developed; elytra yellowish with dark brown or black spots and vittae 3

3 Rim on anterior margin of clypeus broad on sides, but strongly narrowed or almost interrupted medially; elytral pattern as in Fig. 1; punctation of elytra more or less uniform; male with abdomen strongly modified, vaulted, bilobed (Fig. 154). Median lobe of exceptional shape (Fig. 15); paramere, gonocoxae, and gonocoxosternum as in Figs. 20, 25, 30; distribution confined to China (Sichuan) ..... ***aequalis***

- Clypeal rim complete or slightly narrowed medially in some populations of *H. versicolor*; males with normal abdomen; median lobe simple (Figs. 11 - 13) 4

4 Punctation of elytra more or less uniform; elytral pattern variable, but not vittate. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 11, 16, 21, 26; Palearctic species, occurring also in China ..... ***inaequalis***

- Punctation of elytra dual; elytral pattern vittate (in individuals with strongly developed pattern, vittae may be indistinct) 5

5 Elytra in anterior half with larger punctures as numerous as smaller ones; first vitta reaching basal black band or ending shortly before. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 12, 17, 22, 27; Palearctic species, occurring also in China..... ***quinquelineatus***

- Elytra provided with dense smaller punctures, at least in anterior two third interspersed with ew larger punctures; first vitta rarely reaching basal black band, usually ending far before. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 13, 18, 23, 28..... ***versicolor***

6 Lateral margin of elytra distinctly, but not strongly ascending to humeral angle (Fig. 162); epipleuron in anterior half rather broad (Fig. 166, 168), as broad as or even broader than apex of mesotibia. Punctation of elytra coarser, often interspersed with some fine punctures 7

- Lateral margin of elytra strongly ascending to shoulders (Fig. 163); epipleuron in anterior half less broad (Fig. 167), narrower than apex of mesotibia. Punctation of elytra fine, without larger punctures between puncture lines or interspersed with few only 25

7 Punctation in anterior half of elytra distinctly double, coarse punctures interspersed with at least few distinctly smaller ones, in most cases diameter of punctures distinctly smaller than half of larger ones 8

- Punctation of elytra more or less uniform, mostly without scattered punctures of different size; if punctures of different size present, then diameter of smaller ones not less than about half of larger ones 20

8 Habitus more elongate. Median lobe in lateral view evenly curved in distal two thirds, almost straight in apical third (Figs. 31 - 35). Gonocoxae more or less heart-shaped (Figs. 41 - 46). Parameres broadly triangular (Figs. 36 - 39), except in *H. inscriptus* (Fig. 40) 9

- Habitus more rounded. Median lobe in lateral view and parameres of various shape. Gonocoxae not heart-shaped 13

9 Smaller species (3.5 - 4.2 mm). Usually each elytron beside black suture with only two vittae, sometimes with third vitta, very rarely fourth vitta indicated. Median lobe as in Fig. 35, paramere almost L-shaped, not broadly triangular (Fig. 40). Gonocoxae (Fig. 41) rather long; gonocoxosternum as in Fig. 47 ..... ***inscriptus***

- Larger species (3.9 - 5.5 mm). Each elytron with four, more or less well-developed vittae. Paramere broadly triangular (Figs. 36 - 39). Gonocoxae shorter. The following four species can be determined with certainty only by the study of the genitalia, in particular the gonocoxae 10

10 Median lobe laterally in apical third rather thin and deflected upwards (Fig. 34); gonocoxae very short (Fig. 46); paramere and gonocoxosternum as in Figs. 39, 52; eastern Mediterranean distribution ..... ***lernaeus***

- Median lobe laterally in apical third thicker and not deflected upwards; gonocoxae longer..... 11

11 Species usually larger (4.5 - 5.5 mm); male protarsomeres rather broad. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 31, 36, 42, 48; Palearctic species, occurring also in China ..... ***parallellogrammus***

- Species usually smaller (4.1 - 4.9 mm); male protarsomeres less broad 12

12 Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 32, 37, 44, 50; distributed in the southern Iberian Peninsula, North Africa, and Sicily (Italy)..... ***lagari***

- Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 33, 38, 45, 51; endemic to Sardinia (Italy) ..... ***sanfilippoi***

13 Males with metatarsal claws of unequal length, posterior claw shortened, thickened and curved, anterior one simple. Females with apex of gonocoxae prolonged, finger-like (Figs. 61 - 64) (*H. saginatus*-group) 14

- Males with metatarsal claws of equal length. Females with apex of gonocoxae not finger-like..... 17

14 Body shape distinctly narrower; median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 55, 59, 63, 67; distributed in Armenia, Georgia, and northeastern Turkey..... ***armeniacus***

- Body shape broader oval, gonocoxae broader 15

15 Species from Spain; median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 54, 58, 62, 66..... ***fresnedai***

- Species from more eastern regions, reaching their western limit in Sicily (Italy) 16

16 Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 56, 60, 64, 68; distribution confined to China (Gansu)..... ***semenowi***

- Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 53, 57, 61, 65; distributed from eastern Mediterranean to southern Russia, Turkmenistan, and Iran ..... ***saginatus***

17 Punctures on pronotum and elytra coarse and strongly impressed, puncture lines often deeply impressed, almost like grooves. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 101, 102, 103, 100; Holarctic species, occurring also in China..... ***impressopunctatus***

- Punctures on upper surface less coarse and not strongly impressed, puncture lines normal 18

18 Last visible abdominal segment with distinct groove. Males with anterior protarsal claw a little thickened, but not strongly curved and broadly dilated. Females with gonocoxae strongly reduced (Fig. 92). Median lobe, paramere, and gonocoxosternum as in Figs. 81, 86, 98 ***corpulentus***

- Last visible abdominal segment without groove. Males with anterior protarsal claw strongly curved and broadly dilated. Females with large unreduced gonocoxae..... 19

19 Vittae on elytra usually strongly contrasting with light background. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 82, 87, 91, 97; eastern Palearctic species, occurring also in China ..... ***urgensis***

- Vittae on elytra usually less contrasting with background, often very diffusely delimited. Median lobe and paramere as in Figs. 83 - 85, 88 - 90. Gonocoxae strongly variable (Figs. 93 - 96); gonocoxosternum as in Fig. 99; eastern Palearctic species, occurring also in China... ***chinensis***

20 Punctation of elytra coarser, in anterior third at most eight punctures between suture and first puncture line. Males with simple protarsal claws, median lobe not surprisingly long. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 106, 109, 112, 115; Holarctic species, occurring also in China..... ***marklini***

- Punctation of elytra rather fine, in anterior third more than ten punctures between suture and first puncture line. Males with protarsal posterior claw or both claws strongly prolonged..... 21

21 Clypeal grooves large, strongly impressed, clypeal margin near grooves distinctly broadly vaulted, less so in middle of anterior margin. Punctation of elytra in anterior half somewhat unequal, but diameter of smaller punctures not smaller than about half of larger ones. Carina of epipleura meeting lateral margin of elytra well behind shoulders (Fig. 168). Male metatarsal claws of unequal length, inner claw shortened, thickened and curved, external one simple. Median lobe and paramere not unusually prolonged (Figs. 104, 107)..... 22

- Clypeus with margin not broadly vaulted, clypeal grooves less impressed. Punctation of elytra more or less uniform. Carina of epipleura meeting lateral margin of elytra near shoulders (Fig. 166). Male metatarsal claws of equal length. Median lobe and parameres conspicuously long and slender (Figs. 69 - 74) 23

22 Male tarsomeres 1 and 2 of fore tarsi strongly enlarged, tarsomere 3 much narrower (Figs. 150); tarsomeres of mid tarsi also enlarged (Fig. 152). Gonocoxae and gonocoxosternum as in Figs. 110, 113..... ***polonicus polonicus***

- Male tarsomeres 1 and 2 of fore and mid tarsi broader than third tarsomere, but not enlarged to an unusual degree (Figs. 151, 153); protibiae curved (Fig. 151). Genitalia same as in the nominotypical subspecies ..... ***polonicus sahlbergi***

23 Elytra without vittae or these only indistinctly perceptible. Median lobe in lateral view strongly curved, corrugated membrane visible to an unusually large extent (Fig. 70). Protarsal claws of almost equal length, strongly broadened (Fig. 146), shaped like slender leaves. Paramere, gonocoxae, and gonocoxosternum as in Figs. 73, 76, 79; distribution confined to China (Tibet, Sichuan) and northern Pakistan ..... ***zigetangco*** **sp.n.**

- Elytra with four vittae. Protarsal claws of different size, posterior one distinctly longer. Median lobe in lateral view not strongly curved..... 24

24 Body length 4.5 - 5.8 mm. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 69, 72, 75, 78; Holarctic species, occurring also in China..... ***unguicularis***

- Body length 3.5 - 4.0 mm. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 71, 74, 77, 80..... ***novemlineatus***

25 Metacoxal plates and abdominal segments laterally coarsely punctate..... 26

- Metacoxal plates and abdominal segments with fine punctation..... 29

26 Elytral vittae long, almost reaching base of elytra. Elytra in anterior half between puncture lines with fine punctation interspersed with several coarser punctures. Males with anterior protarsal claw much longer than posterior claw; females matt. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 105, 108, 111, 114..... ***nigrolineatus***

- Elytral vittae abbreviated anteriorly, ending far before base. Males with protarsal claws simple... 27

27 Elytra in anterior half between puncture lines without coarser punctures. Head unicoloured yellowish, without dark spots. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 120, 124, 129, 133..... ***pallidulus***

- Elytra in anterior half between puncture lines with fine punctation interspersed with at least few coarser punctures (*H. caspius* very rarely without any such coarse punctures). Head between eyes and on vertex darkened 28

28 Body usually more globose. Coarser punctures between puncture lines in anterior half of elytra more numerous. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 119, 123, 128, 132 ..... ***confluens***

- Body usually more elongate. Only few coarser punctures between puncture lines in anterior half of elytra. Median lobe and paramere as in Figs. 116, 117, 121; gonocoxae and gonocoxosternum as in Figs. 125, 126, 130; Palearctic species, occurring also in China ..... ***caspius***

29 Elytral vittae anteriorly shortened, second and fourth reaching into anterior third, but ending far before base of elytra. Head provided with rather coarse punctures, shining between these even in females which here are finely reticulate. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 136, 139, 142, 145; Palearctic species, occurring also in China ..... ***flaviventris***

- Elytral vittae long, reaching close to base of elytra. Head with coarser punctures sparse; if not so, distinctly reticulate between punctures 30

30 Head with punctation almost as fine as on elytra, interspersed with few coarser punctures only; not reticulate between punctures, shiny. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 134, 137, 140, 143; Palearctic species, occurring also in China ..... ***enneagrammus***

- Head without fine punctures, but with several coarse ones; between these with reticulation of small round cells, matt. Median lobe, paramere, gonocoxae, and gonocoxosternum as in Figs. 135, 138, 141, 144 ..... ***pectoralis***

Notes on selected species, and descriptions of new species

Below, the members of the subgenus *Hygrotus* s.str. are treated first, followed by those of the subgenus *Coelambus*, which are treated in a sequence chosen by ZIMMERMANN (1930: 96 ff.), and NILSSON (1995). I do not use, however, Zimmermann's species groups, because the grouping of *Hygrotus* needs further intensive studies of all *Hygrotus* including the Nearctic ones. *Hygrotus* (*Coelambus*) *zigetangco* sp.n. is placed after the closely related *H. unguicularis*.

For most *Hygrotus* treated in this work numerous synonyms exist, of which, however, only a few are cited, in particular those which are of interest for the Chinese fauna. For more complete lists of synonyms see NILSSON (2001, 2002).

Subgenus *Hygrotus* s.str. STEPHENS, 1828

Hygrotus (s.str.) *inaequalis* (FABRICIUS, 1776)

Dytiscus inaequalis FABRICIUS 1776: 239. - SHARP 1882: 395.
Hygrotus inaequalis (FABRICIUS); ZIMMERMANN 1930: 112. - BALFOUR-BROWNE 1934: 148. - KAMIYA 1940: 120. - ZAITZEV 1953: 127. - LAFER 1989: 235. - NILSSON & KHOLIN 1994: 145. - NILSSON & HOLMEN 1995: 32. - NILSSON 1995: 44, 2001: 210.
Hydrotatus inequalis (ILLIGER); FENG 1936: 2.
Hygrotus inaequalis hokkaidensis SATÔ 1972: 54. - LI 1992: 35. (**syn.n.**)

Type material: *Dytiscus inaequalis*: Types not studied. According to the "type database" of the Zoological Museum, University of Copenhagen (www.zmuc.dk/commonweb/Z_search.htm), three syntypes are stored in the Fabricius collection of the Zoological Museum, University of Kiel, Germany. **Type locality**: Sweden ("habitat in Sveciae aquis stagnantibus").

Hygrotus inaequalis hokkaidensis: Types not studied. According to SATÔ (1972: 55) the male holotype and female paratype are labelled "Futatsuyama, Shibecha-chô, Hokkaido, June 22, 1967, I. Hiura leg." and stored in the Osaka

Museum of Natural History. **Type locality**: Futatsuyama, Shibecha-chô [ca. 40 km NNE Kushiro], eastern Hokkaido, Japan.

Material studied: **China**: NEI MONGOL: 42 exs., "China: Nei Mongol, 22.7.1998, Wengniute Qi Co., ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 327)" (NMW). **Japan**: 1 ♂, "Kawai, Ikeda-cho., Hokkaido, 3.X.1999, leg. Y. Yamakawa", "Hygrotus inaequalis hokkaidensis M. Satô, det. E. Matsui" (CEM).

FENG (1936: 2, figs. 2 - 4) recorded the species from "Shensi" (= Shaanxi), however, under the name *Hydrotatus inequalis* (ILLIGER) and in the tribe Hydrovatini. As BISTRÖM (1997: 94) has stated, the name *Hydrotatus* is a misspelling of *Hydrovatus*. In addition the latter author believed that "on the basis of Feng's illustrations" the species is not a *Hydrovatus*, but "possibly *Hygrotus*". FENG's (1936) figures indeed show clearly that he must have studied a *H. inaequalis*.

For detailed descriptions of *H. inaequalis* see e.g. ZIMMERMANN (1930: 112), and NILSSON & HOLMEN (1995: 32). The male and female genitalia are illustrated in Figs. 11, 16, 21, 26.

Hygrotus inaequalis hokkaidensis: SATÔ (1972: 55) figured the apex of the median lobe in dorsal view and stated: "This new subspecies can be separated from the nominate one by the punctures on elytra somewhat smaller and sparser than those in the latter and the punctures on the pronotum more or less longitudinally wrinkled." I have studied a large number of European and continental Asian specimens and found that these characteristics range within the normal variability of the species. The single Japanese specimen studied fits totally the external and genital features of non-Japanese populations, and thus I have no doubt that the Japanese population does not represent a distinct subspecies: *Hygrotus inaequalis hokkaidensis* SATÔ, 1972 must be treated as a junior subjective synonym of *Dytiscus inaequalis* FABRICIUS, 1776. Already NILSSON & KHOLIN (1994: 145) treated specimens from Japan, Hokkaido, as not belonging to a distinct subspecies, without, however, stating this formally.

Distribution: China: Shaanxi, Nei Mongol, Jilin, Liaoning, "Manchuria"; Japan, Mongolia, Kazakhstan, Russia, and other countries in Asia, Europe, and North Africa.

Hygrotus (s.str.) *aequalis* FALKENSTRÖM, 1932

Hygrotus aequalis FALKENSTRÖM 1932: 192, 1933: 11. - WU 1937: 209. - GSCHWENDTNER 1939: 32. - ZAITZEV 1953: 127. - NILSSON 1995: 45, 2001: 210.

Type locality: northeastern Sichuan, China.

Type material: **Lectotype** (present designation): ♂, a hand-written label, illegible, at the end "22/5", "Typus" [red, unauthorised curatorial label], "Hygr. aequalis [badly legible] n.sp., ♂ Typ, det. Falkenström" [hw Falkenström], "4658, E91 +" [light blue], "Lectotype, Hygrotus aequalis Falkenström, 1932, des. H. Fery 2002" [red] (NRM). "22/5" undoubtedly indicates the collecting date: "22. V. 1930" (see FALKENSTRÖM 1933: 14). **Paralectotypes**: 1 ♀, "Kina, N.O. Szechuan" [printed], "Sven Hedins Exp. Ctr. Asien, Dr Hummel" [printed], "22/5", "Allotypus" [red, unauthorised curatorial label], "Hygr. aequalis [scarcely legible] n.sp., ♀ Typ, det. Falkenström" [hw Falkenström], "4659, E91 +" [light blue] (NRM). 2 ♂♂, 1 ♀, "Kina, N.O. Szechuan" [printed], "Sven Hedins Exp. Ctr. Asien, Dr Hummel" [printed], "22/5"; the males with additional "4662, E91 +" and "4663, E91 +" respectively, the female with "4661, E91 +" [light blue]; all paralectotypes with the respective red label (NRM). According to FALKENSTRÖM (1933: 11) one male and five females had been captured and studied. One of these syntypes seems to be lost. Two of the remaining 'females' proved to be males.

Additional material studied: **China**: SICHUAN: 1 ♂, "China - Sechuan, Wudu - 31°41'N 104°23'E, 3.5.-2.6.[19]97, lgt. E. Kuchera", "Coll. Hendrich, Berlin", "Hygrotus aequalis Falk., Hendrich det. 1997" (CHF). 1 ♂, 2 ♀♀, "China - Sechuan, Pingwu - 32°15'N 104°16'E, 3.6.-9.6.[19]97, lgt. E. Kuchera", "Coll. Hendrich, Berlin", "Hygrotus aequalis Falk., Hendrich det. 1997" (CLH, CHF).

Diagnosis: Habitus short oval, globose (Figs. 1, 164), equalling more or less that of *H. inaequalis*. Body outline in dorsal view with slight discontinuity between pronotum and elytra. Sides of pronotum evenly curved, posterior angles obtuse. Posterior half of elytra with very short and indistinct pubescence. Elytral rim in dorsal view not visible except before apex and very

short part at shoulders. In lateral view epipleural rim distinctly ascending towards humeral angle (Fig. 164), but not as strongly as e.g. in *H. caspius* (Fig. 163). Surface yellow with black pattern. Head with two fused dark brown spots between eyes. Pronotum with base and two more or less confluent medial black spots before base. Elytra with suture and three fasciae black: a narrow one at base, a broad one medially and another broad one subapically. These fasciae, however, strongly lobed, and in particular anterior and medial one connected with narrow longitudinal vitta. This is why I assume that the elytral pattern in fact consists of four or five vittae which are partly intermitted and partly fused. Each elytron in posterior half with narrow black vitta near margin, which is, however, not visible in strictly dorsal view.

Head with clypeal margin distinctly raised, narrowed in middle, but not interrupted. Clypeal grooves flat, beginning at anterior margin and reaching until middle of eyes. Punctation rather dense, somewhat denser and coarser on frons. Microreticulation rather weak, becoming weaker posteriorly, in males imperceptible on posterior part of frons and on vertex. Pronotum not microreticulate, shining. Punctation sparser and coarser than on head, on disc sparser and less coarse, before base distinctly coarser. Impression on centre of disc either almost imperceptible or absent. Sides of pronotum distinctly bordered. Elytra without microreticulation, shining. Punctation still coarser than on pronotum, not dual; in basal third diameter of punctures larger than distance between them, else more or less equalling their distance. Puncture lines not perceptible.

Underside with head yellowish, prosternum yellowish laterally, centre and prosternal process darker brown; venter darker brown in large extent, but centre of metaventrite, parts of metacoxae, metacoxal processes, epipleura, hind margins of first four sternites, and last abdominal segment in total shining through lighter reddish brown. Legs yellowish brown. Antennae of same colour, with articles not darkened apically; third and in particular fourth article shorter than second and fifth. Prosternal process lanceolate, apex shortly rounded; in cross section more or less tectiform behind anterior coxae, here sides narrowly broadened, without small transverse carinae; setae not present; transverse ridge between coxae not very prominent, but perceptible. Epipleura in anterior third broad, at least as broad as apex of mesotibia, provided with several coarse punctures (Fig. 165). Epipleural carina meeting epipleural rim at shoulders at an angle of about 40° (Fig. 165). Carina on inner side of elytra distinctly dilated before the raised ligula, which ends abruptly posteriorly (Fig. 172). Venter without reticulation, shiny. Sides of metaventrite, anterior half of metacoxae, metacoxal processes, and sternites coarsely punctate. Near middle metaventrite having some small punctures. Distance between metacoxal lines large, lines strongly diverging forwards, ending short before hind margin of metaventrite (Fig. 158). Hind margins of metacoxal processes obliquely truncate, central part somewhat prolonged posteriorly (Fig. 158). Middle and hind femora provided with a row of punctures. Mesotibia rather broad, external margin curved (Fig. 155); those of *H. inaequalis* and *H. versicolor* (SCHALLER) illustrated for comparison in Figs. 156, 157. Metatarsal claws equal in length.

♂♂: Shape of median lobe different from all other Hygrotini (Fig. 15); all specimens studied show slight asymmetry of lobe in dorsal view; paramere as in Fig. 20. Foretarsi weakly broadened, foreclaws simple. Last visible abdominal segment very characteristically modified, strongly depressed before apex and - if viewed in an appropriate oblique direction - distinctly bilobed (Fig. 154). It is unclear why FALKENSTRÖM (1932, 1933) has overlooked this very striking feature.

♀♀: Head - except vertex - microreticulate. Last visible abdominal segment normal, indistinctly flattened before apex, hind margin a little elevated. Gonocoxae as in Fig. 25, gonocoxosternum as in Fig. 30.

Measurements: TL: 3.2 - 3.5 mm, MW: 1.95 - 2.1 mm.

Discussion: FALKENSTRÖM (1933: 11) already stated the difficulties in selecting the correct generic placement for his new species, in particular because of the raised, but medially narrowed clypeal margin which is characteristic for *Herophydrus* and *Hyphoporus*. He remarked that *H. versicolor* also has a medially narrowed clypeal margin, an observation which I can confirm for Swedish, but not for German and Finnish specimens which I have studied. On the other hand, the shape of the ligula of *H. aequalis* (Fig. 172) equals that of other *Hygrotus* s.str., such as *H. inaequalis* (Fig. 173) and *H. versicolor* (Fig. 174) and differs from that of *Herophydrus* which has a ligula which is evenly raised posteriorly over a rather long distance and then ends abruptly (see *Herophydrus musicus* in Fig. 175). In my opinion, however, in particular the shape of the male abdomen and that of the median lobe put the species into a special position which must be taken into consideration whenever a revision of Hygrotini is done.

Distribution: Known only from China: Sichuan.

Hygrotus (s.str.) *versicolor* (SCHALLER, 1783)

Dytiscus versicolor SCHALLER 1783: 313. - SHARP 1882: 397.
Hygrotus versicolor (SCHALLER); SEIDLITZ 1887: 39. - ZIMMERMANN 1930: 113. - NILSSON 2001: 211.
Hygrotus fulvicollis MOTSCHULSKY 1853: 4. (nomen nudum)
Hygrotus ramosus MOTSCHULSKY 1853: 4. (nomen nudum)

Material studied: **Russia**: 1 ♂, with small black parallelogram-shaped label, "2." [or "Z."], "Hydroporus fulvicollis Motsch, Rus. mer." [hw Motschulsky], "824." [red] (ZMUM). 1 ♀, "Cronstadt [= Kronshtadt, W of St. Petersburg, Russia]" [red, hw Motschulsky], "822." [red] (ZMUM). 1 ex., "Cronstadt" [red, hw Motschulsky], "Hydroporus ramosus mihi, Cronstadt Camp. Kirg" [hw Motschulsky], "821." [red]; specimen not dissected, it lacks head and pronotum (ZMUM). The label notation "Cronstadt" certainly refers to Kronshtadt [W of St. Petersburg, Russia]. The label data "Cronstadt Camp. Kirg" obviously indicate the distribution of the species rather than a specific locality. To my knowledge, there is no "Cronstadt" in "Camp. Kirg" [= Kyrgyz Steppe, Kazakhstan].

For the nomina nuda *fulvicollis* and *ramosus* see ZAITZEV (1915: 247), and NILSSON (2001: 280). For detailed descriptions of *H. versicolor* see e.g. ZIMMERMANN (1930: 113), and NILSSON & HOLMEN (1995: 32). The male and female genitalia are illustrated in Figs. 13, 18, 23, 28.

Distribution: Russia (West Siberia, North and South European Territories), several other European countries. The occurrence of this species in Kazakhstan, as indicated on one of the labels (see above), still needs confirmation.

Hygrotus (s.str.) *quinquelineatus* (ZETTERSTEDT, 1828)

Hyphydrus quinquelineatus ZETTERSTEDT 1828: 234. - SHARP 1882: 397.
Hygrotus quinquelineatus (ZETTERSTEDT); ZIMMERMANN 1930: 114. - KAMIYA 1940: 121. - BRINCK 1946: 149. - NILSSON 1995: 45, 2001: 210.

Material studied: **China**: NEI MONGOL: 1 ♂, 1 ♀, "North Manshuria, Djalantun [*] St., 20.V.1939, coll. P. Brinck" upper side], "leg. M.A. Weymarn" [under side], "Hygrotus quinquelineatus Zetterstedt, det AN Nilsson-03" (CAN). BRINCK (1946: 149) already recorded these two specimens ("Djalantun, Greater Kingom Mountain [*], alt. 1327 feet, May, 1939"); this locality is not situated in Heilongjiang as erroneously stated by NILSSON (1995: 45).

For detailed descriptions of *H. quinquelineatus* see e.g. ZIMMERMANN (1930: 114), and NILSSON & HOLMEN (1995: 32). The male and female genitalia are illustrated in Figs. 12, 17, 22, 27.

Distribution: China: Nei Mongol, "Manchuria"; Mongolia, Tajikistan, Kazakhstan, Russia, several European countries.

Subgenus *Coelambus* THOMSON, 1860

Hygrotus (*Coelambus*) *polonicus polonicus* (AUBÉ, 1842)

Hydroporus polonicus AUBÉ 1842a: 230, 1842b: 345. - SHARP 1882: 402.
Coelambus polonicus (AUBÉ); ZIMMERMANN 1930: 97 (partim). - ZAITZEV 1953: 134 (partim).
Hygrotus polonicus (AUBÉ); NILSSON & HOLMEN 1995: 34 (partim). - NILSSON 2001: 208.

Type locality: Poland, Warszawa.

Type material: **Lectotype** (present designation): ♀, "Varsovie", on reverse "Waga [collector]" [round label, hw Aubé], "Lectotype, Hydroporus polonicus Aubé, 1842, des. H. Fery 2002" [red]; the third specimen in a row of five; coll. Aubé (MNHN). **Paralectotypes**: 2 ♀♀ (the forth and fifth specimens in the row), without labels, but with the same pins and identically prepared as the lectotype, coll. Aubé (MNHN). All paralectotypes with the respective red label. Specimens originally pinned, mounted on glue cards by me, as well as the original pins. The first two specimens in the row mentioned above are males, the first one with the same label data as the lectotype, the second one without any label. These specimens do not belong to the syntype series, because AUBÉ (1842a: 230) used only females for his description. According to AUBÉ (1842b: 345) the author got the males after the original description was completed.

Additional material studied: **Kazakhstan**: 2 exs., "Rossia: bei Uralsk, Tümpel am Ufer des Ural. 9-VII-1928", "Dr F. Guignot det., 1949, Coelambus polonicus Aubé" [hw Guignot] (IRSN). 2 ♂♂, "17.5.1992 Kazakhstan, Kaznakovka, ca. 48.50N 83.20E, M. Danilevsky leg." (CPM) (first record for Kazakhstan). **Russia:** 2 ♂♂, 4 ♀♀, "USSR, Altaj, Kurja [ca. 51.35N 82.17E], 5.VI.1984, leg. Shilenkov" (HNHM, CHF). 1 ♂, "SSSR, Simbirsk", "Simbirsk, S.S.S.R." [hw Gschwendtner], "Coll. Gschwendtner", "Coelambus polonicus Aub, det. Gschwendt." [hw Gschwendtner in part] (OLML). 2 ♂♂, 3 ♀♀, "N. Uralskiy Mts., near Koziva vill. [= Kozhva = Koshwa, ca. 65.07N 57.01E], Pechora riv. VII-[19]78" (CFP). 1 ♂, 2 ♀♀, "Russia eur., Reitter" [printed], "Coel. polonicus, Coll. Reitter" (HNHM). 2 ♀♀, "Russia eur., Reitter" [printed], "Coelambus polonicus" [hw?], coll. Wehncke (MNHN). 1 ♀, "Sarepta, Becker" [printed], "Coelambus polonicus" [hw?], coll. Wehncke (MNHN). **Ukraine:** 1 ♂, "Kiew" [small round grey label], on reverse "54 ...", "Coelambus polonicus, Aubé, J. Balfour-Browne det." (BML). 1 ♀, "Kiew" [hw Régimbart], "polonicus Aubé" [hw Régimbart], coll. Régimbart (MNHN). 1 ♂, "Hochh [= Hochhuth?]", "polonicus Aubé, Kiew", "ex Musæo Rosenhauer", coll. Wehncke (MNHN). 1 ♂, 1 ♀, "Hydroporus polonicus, D.S." [text and respective sex symbol on glue card, hw Sharp], the male with additional "H. polonicus, Kiew., Rosenh.", "Collection de Bonvouloir", "D. Sharp, Monogr.", coll. Wehncke (MNHN). 1 ♂, "polonicus, Kiew (Rosenhr.)", coll. Heyden (DEI). 1 ♀, "Coll. Kraatz", "polonicus Aubé, Kiew Hochh.", "Zimmermann det." (DEI). 1 ♀, "Kiew", "Coll. Kraatz", "Zimmermann det.", "Coelambus polonicus Aubé" (DEI). 1 ♀, a triangle on a small green label, "Kiew", "coll. Stierlin", "H. polonicus Aubé" (DEI). 2 ♀♀, "10087", "Kiew, Grimm", "polonicus Aubé" (MNB). 1 ♂, "Polonicus Aubé, Volhyn [= Wolhynien = Wolynska Oblast, NW Ukraine]", "ex Musæo Thorey", coll. Wehncke (MNHN) (first record for the Ukraine). **Poland**: 1 ♀, "Coelambus polonicus Aubé ♀, det. Guéorg 1972 + Galewski, Pulawy [ca. 50 km NW Lublin] 1934, ex. coll. Sz. Tenenbaum" (CKD). 1 ♀, "polonicus Aub., Polgn", "6756", "Coelambus polonicus, Aubé, J. Balfour-Browne det." (BML). 1 ♀, small yellow label, "1923", "Polonicus. Aube, Polonia. (Fairm)", "6756", "Coelambus polonicus, Aubé, J. Balfour-Browne det." (BML).

For detailed descriptions of *H. polonicus* see e.g. ZIMMERMANN (1930: 97), and NILSSON & HOLMEN (1995: 34). The male and female genitalia are illustrated in Figs. 104, 107, 110, 113, the epipleura in Fig. 168.

The males of both subspecies have metatarsal claws of unequal length, the posterior one shortened, thickened and curved, the anterior one simple. This feature seems to have been overlooked until now. It is found also in the members of the *H. saginatus*-group (see below). *H. polonicus*, however, cannot be included in this group because it differs with respect to several other characteristics: shape of gonocoxae, male protarsus, prolonged male anterior claws etc. (see the key to the species).

Distribution: Kazakhstan, Russia (North and South European Territories, and Altai), Finland, Belarus, Poland, Ukraine.

Hygrotus (*Coelambus*) *polonicus sahlbergi* (SHARP, 1882)

Coelambus unguicularis SAHLBERG 1880: 47. (homonym)
Coelambus sahlbergi SHARP 1882: 402, 973. (replacement name)
Coelambus polonicus sahlbergi SHARP; ZAITZEV 1910: 26.
Coelambus polonicus (AUBÉ); ZIMMERMANN 1930: 97 (partim). - ZAITZEV 1953: 134 (partim).
Hygrotus polonicus (AUBÉ); NILSSON & HOLMEN 1995: 34 (partim). - NILSSON 2001: 208.

Type locality: Russia, Krasnoyarskiy Kray, "prope insulam Tschornaja ostrov [= Tschernoostrovskoye = Chernoostrovskoye, ca. 64.36N 87.45E] et prope vicum Poloj" [= Poloy, ca. 66.43N 86.34E].

Type material: **Lectotype** of *Coelambus unguicularis* SAHLBERG (present designation): ♂, "Tschornoja Ostrov 63°50'" [printed], "Ob-Jenisej-Exp., 1876. F. Trybom, det. J. Sahlberg" [printed], "J. Sahlb. ind. typ." [printed], "Typus" [red, printed], "Caelambus ungricularis J. Sahlb." [sic! hw?], "261, 89" [red, printed in part], "Riksmuseum Stockholm", "Coelambus ♂ polonicus Aubé, det. A. Nilsson -89" [hw Nilsson], "Lectotype, Coelambus *unguicularis* J. SAHLBERG, 1880, des. H. Fery 2002" [red] (NRM). **Paralectotypes**: 1 ♂, "Sibir. arct." [printed], "J. Sahlbg." [printed], "J. Sahlb. ind. typ." [printed], "33" [printed], "262, 89" [red, printed in part], "Riksmuseum Stockholm", "Coelambus ♂ polonicus Aubé, det. A. Nilsson -89" [hw Nilsson] (NRM). 1 ♂, "Type" [round label, red margin, printed; most probably mounted by J. Balfour-Browne], "Jenisei 61° - 68°, July 1876, Sahlberg" [hw Sharp], "Sharp Coll., 1905-313.", "Type 458, Coelambus Sahlbergi" [hw Sharp], "Jenisei" [hw Sharp] (see SHARP 1882: 403) (BML). 1 ♂, "Tschornaja ostroff." [hw J. Sahlberg], "J. Sahlb." [hw J. Sahlberg], "J. Sahlb. ind. typ." [printed], "l. [?]", "Typus" [red, printed], "Coll. Kraatz" [printed], "Coelambus unguicularis Sahlbg." [hw?], "Syntypus" [red, printed]; the specimen lacks abdomen and right protarsus (DEI). 2 ♂♂, the first one labelled "J Sahlb" [hw Wehncke], "Sibiria, Tschor'ostoff" [hw Wehncke], the second standing beside the first one, without any label, but with the same pin and identically prepared, coll. Wehncke/Oberthür (MNHN). All paralectotypes with the respective red label. According to SAHLBERG (1880: 47) further syntypes in "Mus. Holm., ..., Coll. Hagl[und]., Coll. Sahlb.". *Coelambus unguicularis* SAHLBERG is preoccupied by *Coelambus unguicularis* CROTCH, 1874; it has been replaced by *Coelambus sahlbergi* SHARP, 1882.

Additional material studied: **Russia**: 1 ♂, "Russia, Siberia 18.VI.1991, NE Yakutia, Srednekolymsk [= Srednekolymsk] (67°30'N, 154°E)" (CJH). 1 ♂, 1 ♀, "Fl. Lena m.", "B. Poppius" (ZMH). 1 ♂, "Fl. Lena m.", "B. Poppius", "Coel. unguicularis Sahlb., Coll. Reitter" (HNHM). 1 ♀, "Olekminsk [ca. 60.23N 120.11E]", "Fl. Lena s.", "B. Poppius", "6538" (ZMH). 1 ♀, "Ust Vilui [*]", "Fl. Lena", "B. Poppius", "3628", "unguicularis J. Sahlb., nom. occup." [hw J. Sahlberg] (ZMH). 1 ♂, "Ust Vilui", "Fl. Lena", "B. Poppius", "Coel. unguicularis Sahlb., Coll. Reitter" (HNHM). 6 ♀♀, "Ust Aldan [*]", "B. Poppius", "Coelambus Sahlbergi Sharp" [hw J. Sahlberg] (ZMH). 1 ♂, "Ust Aldan", "B. Poppius", "Coel. unguicularis Sahlb., Coll. Reitter" (see POPPIUS 1905: 9, ZAITZEV 1910: 26) (HNHM). 5 ♀♀, "Sibirien, Marcha [ca. 62.05N 129.46E] b. Jakutsk, 16.VII.[19]08, Pfizenmayer V." (MNB, CHF). 1 ♂, 1 ♀, "Sibirien, Jakutsk, Bestjach [ca. 61.22N 128.50E], 5.-10.VI.[19]04, E. Pfizenmayer V." (MNB, CHF). 2 ♀♀, "Sibirien, Jakutsk, Bestjach, 29.-30.VI.[19]04, E. Pfizenmayer V." (MNB, CHF). 2 ♂♂, "Nikulina. [= Nikulino, ca. 60.25N 90.02E, pers. communication by O. Biström]", "Wuorentaus" [collector], "Coelambus polonicus Aubé, det. A. Nilsson"; one specimen with additional "630", the other with "631" (ZMH).

Descriptive notes: According to SAHLBERG (1880: 47), and ZAITZEV (1910: 26) the males of *H. p. sahlbergi* have a posterior protarsal claw which is said to be almost twice as long as the anterior one, this being the only characteristic separating both subspecies. The length of the claws, however, is rather variable in both, and I have not seen any male which has an anterior protarsal claw shorter than one third the posterior one, at most. Males of *H. p. sahlbergi*, however, can be separated easily from the nominotypical subspecies by the shape of the tarsomeres of the pro- and mesotarsi: the first and second tarsomeres are broadened (Figs. 150, 152), but on no account as strongly as in *H. p. polonicus* (Figs. 151, 153). In addition the protibia is more curved than in the nominotypical subspecies (compare Figs. 150 and 151).

The male and female genitalia are of the same shape as in *H. p. polonicus* (Figs. 104, 107, 110, 113). All females studied have a shiny surface.

Distribution: Russia (East and Central Siberia); known only from Jenisei, and the area east of this river.

Discussion: The introduction of a separate group ("Gruppe I") for *H. polonicus* by ZIMMERMANN (1930) was based only on the strongly broadened male tarsomeres. After the detection of the rather small tarsomeres 1 and 2 in *H. p. sahlbergi*, however, it does not seem to be justified to retain a separate group for this species. At present, *H. polonicus* - although distinctly different in the shape of the male and female genitalia - seems to be related more closely to *H. unguicularis*, *H. novemlineatus*, and *H. zigetangco* sp.n. ("Gruppe III" in ZIMMERMANN 1930). At present it is not clear whether the subspecific status of *H. p. sahlbergi* is correct. If more material - in particular from western Siberia - becomes available, both populations might even turn out to be treated as distinct species. More probably, however, only methods of molecular biology will lead to an acceptable solution of this problem.

Hygrotus (*Coelambus*) *impressopunctatus* (SCHALLER, 1783)

Dytiscus impressopunctatus SCHALLER 1783: 312. - SHARP 1882: 403.
Coelambus impressopunctatus (SCHALLER); ZIMMERMANN 1930: 98. - FENG 1933b: 325, 1936: 7. - WU 1937: 208. - KAMIYA 1938: 17, 1940: 119. - ZAITZEV 1953: 134. - LAFER 1989: 236.
Hygrotus impressopunctatus (SCHALLER); GANGLBAUER 1892: 453. - BALFOUR-BROWNE 1934: 148. - BALFOUR-BROWNE 1947: 438. - NILSSON & KHOLIN 1994: 146. - NILSSON & HOLMEN 1995: 35. - NILSSON 1995: 45, 2001: 207.
Dytiscus ovalis THUNBERG 1784: 19.
Coelambus chinensis var. ♀ *opacus* FALKENSTRÖM 1932: 192, 1936: 2. - GSCHWENDTNER 1939: 32.
Coelambus chinensis SHARP; RÉGIMBART 1899: 200 (partim). - FALKENSTRÖM 1933: 10. (misidentification)
Coelambus chinensis ab. *opacus* FALKENSTRÖM; ZAITZEV 1953: 135.
Coelambus impressopunctatus roborovskii ZAITZEV 1953: 135. - GUÉORGUIEV 1970: 255. - ZAITZEV 1972: 141. **(syn.n.)**
Hygrotus impressopunctatus roborovskii (ZAITZEV); NILSSON 2001: 207.
Coelambus impressopunctatus hiurai SATÔ 1972: 54. **(syn.n.)**
Hygrotus impressopunctatus hiurai (SATÔ); NILSSON 2001: 207.

Type material: *Dytiscus impressopunctatus*: Types not located; according to HORN et al. (1990: 344) the types have been lost in the "Waisenhaus Halle a. S.". **Type locality**: not specified by SCHALLER (1783: 312), most probably near Halle, Germany.

Coelambus chinensis var. ♀ *opacus*: **Holotype** (♀): "S. Mongoliet, 1927", "Sven Hedins Exp. Ctr. Asien, Dr Hummel", "Allotypus" [red, unauthorised curatorial label], "Coel. chinensis Sharp ♀ matt, det. Falkenström" [hw Falkenström] (NRM). **Type locality**: "Southern Mongolia".

Coelambus impressopunctatus roborovskii: **Lectotype** (present designation): ♂, "Ulanbulak, Humboldt-Kette, Nanschan, Exped. Roborowskij/Kozlov, 8.VI.[18]94" [Cyrillic], "subsp. roborovskii m." [hw Zaitzev], "Zool. Inst. Acad. Sci. USSR, Leningrad", a red label without text, "Lectotype, Coelambus impressopunctatus roborovskii Zaitzev, 1953, des. H. Fery 2002" [red] (ZISP). **Paralectotypes**: 3 ♂♂, same label data as the lectotype, except the second one; all paralectotypes with the respective red label (ZISP). **Type locality**: "Sinkiang [= Xinjiang]: Ulan Bulak [*], between Humboldt Range [*] (Wu-Lan-ta pan Shen) and Nan Shan [*] (Kansu-tsing Hai [*]) (8 June 1894, Roborovskii and Kozlov, 4 specimens)", China.

Coelambus impressopunctatus hiurai: **Types**: I have not been able to study the male holotype and the single female paratype; according to SATÔ (1972: 54) both are stored in the Osaka Museum of Natural History (Japan). **Type locality**: Kushiro-shi [ca. 43.00N 144.20E], Otanoshi-ike Coast, Kushiro, Hokkaido, Japan.

Additional material studied: **China**: XINJIANG: 1 ♂, 1 ♀, "Ost-Turkestan [= Xinjiang], Aksu [ca. 41.09N 80.15E], 1067 m, 5.1903. Coll. Hauser." (CHF, further specimens in MNB). 1 ♀, "Prov. Kuldscha [*], Ober. Jli-Thal [= upper Ili valley], F. Hauser 1897", "Coelambus spec.?", "coll. Dr. J. Fodor" (HNHM). QINGHAI: 14 exs., "China-Qinghai, Nan Shan, Caka Nun [*], 3300-4200 m, 9.-13.VII.1994, B. Zvaric. Coll. Hendrich" (CLH, CHF). SICHUAN: 1 ♂, 1 ♀, "China, N Sichuan, 25 km NNE Zhangla, 33.04N/103.45E, 4100 m J. Rejsek leg., 4.-5.viii.2001" (CJS). 1 ♀, "China - Sichuan prov., Tagu vill. 100 km NW off [sic!] Kanding 3500 m, 21.-25.8.1995, J. Schneider lgt." (CFP). NEI MONGOL: 3 ♀♀, "China: Nei Mongol, 22.7.1998 Wengniute Qi Co., ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 329)" (NMW). 1 ♀, "China: Nei Mongol, 22.7.1998, Wengniute Qi Co., ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 327)" (NMW). 1 ♀, "China: Nei Mongol, 22.7.1998, Wengniute Qi Co., ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 328)" (NMW). HEILONGJIANG: 3 exs., "Charbin [= Harbin], 5.8.52 (BML). 7 exs., Harbin, 28.9.30, v. Jettmar

S.V." (CGW). 1 ♂, 6 ♀♀, "Cheng Chin [*], Lesser Khingan [*], Manchoukuo", "20.VI.[19]38, M. Weymarn", all specimens except one female with additional "Hygrotus (C.) impressopunct. Sch., J. Balfour-Browne det. 1944" (see BALFOUR-BROWNE 1947: 438) (BML, CRA). GANSU: 2 ♂♂, "Tay-ho, Chass.rs Thibét.s, 1896", "ex Wehncke, Muséum Paris, ex coll. R. Oberthur" (MNHN). 1 ♀, "Tay-ho, Chass.rs Thibét.s, 1896", "chinensis Shp." [hw Régimbart], "Muséum Paris, coll. Maurice Régimbart, 1908" (MNHN). RÉGIMBART (1899: 201) presented this (or these) specimen(s) under *H. chinensis* and gave the locality as "Su-Tchouen: Tay-Ho"; today "Su-Tschouen" is called "Suzhou" or "Jiuquan" (ca. 39.44N 98.30E) in the northwestern part of Gansu province, a region which probably has been treated as belonging to Tibet in the past. I have not been able to locate a lake (ho = hu = lake) which is called "Tay" or "Tai" near Jiuquan. On the other hand a "Suzhou" exists in Jiangsu province, ca. 80 km W Shanghai, and a "Tai-hu" west of it. This locality, however, belongs to the Eastern Central China zoogeographical region (SC-A in JÄCH & JI 1995b: 10) which seems not to match the known distribution of *H. impressopunctatus*. Future collections are welcome and will help to clarify this problem. **Inexact label data**: 5 ♂♂, 4 ♀♀, "Thibet, Dutreuil de Rhins [Jules-Léon Dutreuil de Rhins, French explorer, 1846 - 1894], 1893", "Muséum Paris, 1960, coll. F. Guignot" [under *Coelambus chinensis*] (MNHN). 2 ♂♂, 2 ♀♀, "Museum Paris, Thibet, Dutreuil de Rhins, 1893", one specimen with "chinensis Sharp" (IRSN). **Japan**: 19 exs., "Bakkai, Wakkanai City, Soya s-Pref., Hokkaido, Japan, 27th, August, 1988, Y. & T. Abe" (CLH, CHF). **Pakistan**: 6 ♂♂, 4 ♀♀, "NW Pakistan 4260 m, Shandur Pass, 60 km ENE Chitral, J. Rejsek 16.-17.7.1998" (CHF, further specimens in CJS) (first record for Pakistan). **Afghanistan**: 1 ♂, 5 ♀♀, "Band.i.Amir, 2700 25.VIII.[19]75", "Muséum Paris, 1983, coll. Legros" (MNHN). 6 exs., "Afghanistan, Kuschke, coll. Hauser 1898" (NMW). 5 exs., same label data (DEI) (first record for Afghanistan). **Kyrgyzstan**: 3 ♂♂, 1 ♀, "Kirghizia: Issyk-Kul, bank S. Chon-Urjukty, 19.-23.VI.1993, 1600 m, leg. Schawaller" (SMNS). 18 exs., "13.07.1996 Kyrgyzstan, Suusamyr Plateau, 2250 m, Dolin leg. (N 40)" (NMW) (first record for Kyrgyzstan). **Tajikistan**: 2 exs., "Turkestan, Pamir, Jaschil-Kul [= Yashil-kul, ca. 37.45N 72.53E], 4665 m, 23.8.[18]89, Conradt S.", "Coelambus chinensis ♀ ?, det. G. Wewalka 75" (MNB) (first record for Tajikistan). **Uzbekistan**: 1 ♂, "15.6.1992 Uzbekistan, Bukhara, 200 m, M. Danilevsky leg." (CPM) (first record for Uzbekistan). **Moldavia**: 2 exs., "Moldau SSR, Losowo, 3.8.[19]74, UV-lux, Ostawitschuk leg." (MNB) (first record for Moldavia). **Romania**: 12 exs., "Romania, Donau [= Danube] delta", on reverse either "17.VI.1988, Šťastný lgt.", or same data except day (CJS) (first record for Romania). For **Mongolian** records the reader is referred to Guéorguiev's numerous publications.

A Holarctic species which is quite variable particularly with respect to punctation of the elytra. For detailed descriptions of *H. impressopunctatus* the reader is referred e.g. to ZIMMERMANN (1930: 98), and NILSSON & HOLMEN (1995: 35). The male and female genitalia are illustrated in Figs. 100 - 103.

Notes on the syntypes of *Coelambus impressopunctatus roborovskii*: The original description is rather short and shall be reproduced here (English translation, ZAITZEV 1972: 141): "Smaller than the eastern Siberian form [of *H. impressopunctatus*] (3.6 - 3.8 mm), very narrow, almost pointed posteriorly; dots in anterior half of elytra sparser than in the typical form, simple and markedly less coarse." I have studied all four syntypes (see ZAITZEV 1953: 135) and can confirm the specifications made by Zaitzev - except the data for the length. The specimens indeed are rather small: TL: 3.9 - 4.3 mm, MW: 1.9 - 2.2 mm, however, not as small as given in the original description. In ZIMMERMANN (1930: 99) a range of the TL between 3.8 and 5 mm already is given for *H. impressopunctatus*, thus the syntypes of *H. i. roborovskii* are not surprisingly small. The shape of the habitus and the punctation of the surface are very variable in *H. impressopunctatus* and in this respect the four syntypes also are not particularly exceptional. The male anterior protarsal claw is slightly less broadened than usual, the apex thus appearing more pointed. I found the colour of the surface somewhat remarkable, which has an unusual tendency to be reddish yellow-brown. The same colour is found in the 2 ♂♂ and the 1 ♀ from "Su-Tchouen: Tay-Ho", as well as in the 7 ♂♂ and 6 ♀♀ with label text "Thibet, Dutreuil de Rhins" (see above). All males have the same shape of the anterior protarsal claw as the syntypes of *H. i. roborovskii*. The specimens from "Tay-Ho" have an elytral punctation which is almost as sparse as that of Zaitzev's types, and the female is rather small (TL: 4.3 mm, MW: 2.3 mm; the males a little bigger: TL: 4.6 - 4.8 mm, MW: 2.4 - 2.5 mm). The male genitalia of the syntypes and also those of the other specimens mentioned above coincide in all respect with those of specimens from other populations. Finally, I want to point out that specimens from "Nan Shan, Caka Nun"

(see above) - a locality which is situated close to the type locality of *H. i. roborovskii* - does not differ at all from "normal" *H. impressopunctatus*.

All features described above fall into the wide range of variability of this species, and thus I come to the conclusion that the rank of subspecies for *H. i. roborovskii* is not justified.

Coelambus impressopunctatus hiurai: SATÔ (1972: 54) separated his subspecies from other *H. impressopunctatus* as follows: "The new subspecies differs from the nominate one in following points: punctures fine on the head, less irregular on the posterior area of pronotum, and oval and well defined on elytra; median lobe of male genitalia relatively slender." Although I have studied only non-typical material from Hokkaido, I have no doubt that this population does not represent a distinct subspecies. The separating characteristics given by SATÔ (1972) are superficial and range within the normal variability of this species. The shape of the male and female genitalia also do not allow a separation of the Japanese population. As in *H. i. roborovskii* I come to the conclusion that *H. i. hiurai* cannot be seen as a subspecies of *H. impressopunctatus*. NILSSON & KHOLIN (1994: 146) did not treat specimens from Japan, Hokkaido, as belonging to a distinct subspecies, without, however, stating this formally.

Distribution: China: Xinjiang, Qinghai, Sichuan, Nei Mongol, Heilongjiang, Liaoning, Hebei, Shaanxi, "Manchuria"; Tibet (?); Japan, Mongolia, Kashmir, Uzbekistan, Turkmenistan, Kazakhstan, Russia, and other countries in Asia, Europe, and North America.

Hygrotus (*Coelambus*) *chinensis* (SHARP, 1882)

Coelambus chinensis SHARP 1882: 398. - RÉGIMBART 1899: 200 (partim). - ZIMMERMANN 1930: 100 - FENG 1933a: 23, 1933c: 101. - WU 1937: 208. - ZAITZEV 1953: 135. - YOON & KEE-JEONG 1986: 146. - ZENG 1989: 3. - LEE et al. 1992: 48. - LI 1992: 35.

Hygrotus chinensis (SHARP); BALFOUR-BROWNE 1947: 438. - NILSSON 1995: 45, 2001: 205.

Coelambus vittatus SHARP 1884: 441. - RÉGIMBART 1899: 201. - ZIMMERMANN 1930: 100 - KAMIYA 1938: 18. - ZAITZEV 1953: 135.

Coelambus semenowi JAKOVLEV; FENG 1933c: 102. - WU 1937: 208. - GSCHWENDTNER 1939: 31. - ZAITZEV 1953: 138. (misidentification)

Type material: *Coelambus chinensis*: **Lectotype** (present designation): ♂, "Type" [round label, red margin, printed; most probably mounted by J. Balfour-Browne],"China, Kiu Kiang" [hw Sharp], "Sharp coll., 1905-313", "Sharp coll., 1905-313" [sic! two times!], "Type 206" [hw Sharp], "Coelambus chinensis n.sp., Kiu Kiang" [hw Sharp], "Kiu Kiang" [yellow, hw Sharp?], "Lectotype, Coelambus chinensis Sharp, des. Fery 1990" [red] (BNMH). BALFOUR-BROWNE (1947: 439) stated that *H. chinensis* has been "described on a single male". From SHARP (1882: 398), however, it cannot be inferred that he has based his description on a single specimen. **Type locality**: "Kiu Kiang", China. Today "Kiu-Kiang" is called "Jiu-Jiang". It is located in the north of Jiangxi province at the border of Hubei and Anhui provinces, ca. 600 km WSW Shanghai.

Coelambus vittatus: **Lectotype** (present designation): ♂, "Coelambus vittatus, Type D.S., Junsai. Japan, 29.8.[18]80" [text on glue-card, hw Sharp], "Type" [round label, red margin, printed; most probably mounted by J. Balfour-Browne], "Japan", "Sharp Coll, 1905-313", "Lectotype, Coelambus vittatus Sharp, des. Fery 1990" [red] (BML). According to SHARP (1884: 442) three further syntypes should exist, which, however, I have not been able to study. These specimens, nevertheless, become paralectotypes by the present designation. D. Bilton has recently visited the BML and kindly communicated: "There are two other specimens of *vittatus* that Sharp has apparently studied. One, a male, has Sharp's characteristic labelling on the card, and bears a label 'Japan'. The other, a female, bears a label 'Japan G. Lewis 1910-320'. This lacks writing on its card, but has a label '*Coelambus vittatus*' on the pin, apparently in Sharp's handwriting." **Type locality**: Junsai, ca. 20 km NNE Hakodate, southwestern Hokkaido, Japan.

Additional material studied: **China**: NEI MONGOL: 1 ♂, 1 ♀, "China: Nei Mongol, 22.7.1998, Wengniute Qi Co., ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 329)" (NMW). 1 ♂, same label data, but "(CWBS 327)" (NMW). 1 ♀, "China: Nei Mongol, 24.7.1998, Ganjig Ka Co., ca. 180 m, 20 km SW Ganjig, Daqing Shan NP, Schönmann, Ji, Wang (CWBS 330)" (NMW). HEILONGJIANG: 7 ♂♂, 7 ♀♀, "Mandsch. [= Manchuria]" (MNB). 14 exs., "Harbin, 28.9.[19]30, v. Jettmar S.V." (MNB). 6 exs., same label data (CGW). 3 exs., "N. China: Charbin [= Harbin], 2.X.1952, B.M. 1953-715" (CGW). 4 exs., "N. China, P.M. Hammond, B.M. 1967-

215", "Heilungkiang, Harbin, 26.6.[19]66, P.M. Hammond"; all specimens with a blue label with numbers "927", "929", "930", or "936" (CGW). 5 ♂♂, "Harbin, Manchuria, 15.IX.[19]40, M. Weymarn" (CRA). 1 ♀, "Charbin, Manchukuo, leg. W. Alin, 15.8.1939" (OLML). 1 ♂, 1 ♀, same label data (MNB). 2 ♂♂, 1 ♀, same label data, one specimen with additional "Semenovi, det. Gschwendt." (DEI). 1 ♀, "Charbin, Mandschurei, 8.8.50", "Muséum Paris, 1960, coll. F. Guignot" (MNHN). JILIN: 1 ex., "NE China: Jilin, Baihe City, 19.8., Changbaishan Res. st., Ji & Wang 1994 (25)" (CWBS 89) (NMW). 2 exs., "Weishaho [*], Manchuria, VI.-VII.[19]39, M. Weymarn", one specimen with additional "Hygrotus (C.) chinensis Sharp, J. Balfour-Browne det., 1944." (see BALFOUR-BROWNE 1947: 439) (CRA). LIAONING: 1 ♂, 1 ♀, "Liaoning", "coll. Gschwendtner", "Semenovi Jak., det. Gschwendtner" (see GSCHWENDTNER 1939: 31) (OLML). 1 ♀, "China: Liaoning, 50 km SE Benxi, 26.9.1994, 200 m, leg. Ji & Wang (58)" (CWBS 122) (NMW). 2 exs., "China: Liaoning, E Shenyang, 14.8.1994, Ufer des Hun He, leg. Ji, Wang, Jäch (1)" (CWBS 64) (NMW). 1 ex., "NE China: Liaoning, Yiwulüshan, 23.8., NW Beizhen, leg. Jäch 1994 (35)" (CWBS 99) (NMW). 1 ex., "China: Liaoning, 30 km S Shenyang, 18.7.1995, 30 m, leg. Wang (CWBS 153)" (NMW). 5 exs., "China: Liaoning (154), 30 km S Shenyang, 30 m, 18.7.1995, leg. Wang" (CWBS 154) (NMW). 4 exs., "China: Liaoning, 15 km SE Anshan, 4.5.1995, 350 m, leg. Wang (CWBS 147)" (NMW). 3 exs., "China: Liaoning (148), 7 km NW Xinmin, 50 m, 2.6.1995, leg. Wang" (CWBS 148) (NMW). 1 ex., "China: Liaoning (149), 7 km NW Xinmin, 50 m, 2.6.1995, leg. Wang" (CWBS 149) (NMW). 6 exs., "China: Liaoning 1994, 55 km NW Dandong, 20 m, 4 km S Fengcheng, 24.9., leg. Ji & Wang (50)" (CWBS 114) (NMW). "MANCHURIA": 1 ♀, "Mandtschuria [sic!], Chandaochedzy [not found on any map], 22.VII.[1]914", "Zool. Inst., Acad. Sci. USSR, Leningrad" (ZISP). BEIJING: 1 ♂, "Peiping [= Beijing]", "Collector C. F. Wu", "Dytiscidae", "coll. Gschwendtner", "Semenovi Jak., det. Gschwendtner" (see GSCHWENDTNER 1939: 31) (OLML). SHAANXI: 1 ♀, "Nordw. [= NW] China, Süd-Schensi [= southern Shaanxi]", "Coelambus semenovi J.", "coll. V.B. Guéorgiev", "Coelambus semenovi Jak., det. M. Brancucci" (NMB). These label data are somewhat irritating, because "southern Shensi" (Shensi = Shaanxi) is hardly to associate with "northwestern China" if "China" is regarded as that political unit which it represents today. If China, however, is seen in its ancient sense (e.g. without Nei Mongol, and Tibet in its widest interpretation; see JÄCH & JI 1995b: 15) the label data appear more consistent. TAIWAN: 1 ♀, "Formosa [= Taiwan], 1904, Haberer leg." (CLH). **North Korea**: 3 exs., "Korea, 1956, Dr. M. Magyar", "Sarivon, VII.12-14" (HNHM). 1 ♀, "Korea: Kaesong City, Kaesong, Hotel Janamsan, at light, 29.VII.1982", "No. 873, Forró & Ronkay" (HNHM) (first record for North Korea). **South Korea**: 1 ♀, "Korea, Gottsche", "Söul 8.[18]84", "63735" [historical museum number], "chinensis Sharp?", "Zool. Mus. Berlin" (MNB). 1 ♂, "Korea, Kyongsan-namdo, Pusan, 15 June 1972, Chong, Chun Sik" (CGW). See also the records from South Korea given by YOON & KEE-JEONG (1986: 146). **Japan**: 1 ♂, 1 ♀, "Japon, Hakodaté [Hokkaido], R. P. Faurie, 1er Trim. 1897", "Dr Régimbt vidit 1898", "vittatus Sharp" [hw Régimbart] (MNHN). 8 exs., "Higashu-Ogu town, Arakawa-ku, Tokyo Met., Japan, 17th August 1988, leg. Y. & T. Abe" (CHF). 4 exs., same label data, but "13th Aug. 1989" (CHF). 5 exs., "Watarase Marsh, Shinoyama, Fujioka Tochigi, Japan, 10th August 1988, legit T. Abe" (CHF). **Russia**: 1 ♀, "Winogradowka, Ussuri region, leg. Kirichenkow, 4.VIII.[1]929" [Cyrillic] (ZISP). 1 ♀, "Khabarovsk, Province, Slavianka, 20 km N Troitskoye, 14.-19-VI.1990, Amur bank, leg. W. Schawaller" (SMNS). 1 ♀, "Krasnaja, Rjetschka, Chabarowsk", "1935.40, ges. 1913, W. Mittermayer", "coll. Gschwendtner", "Semenovi Jak., det. Gschwendtner" (see GSCHWENDTNER 1939: 31) (OLML). 1 ♂, 1 ♀, "Russia Orient., Khabarowskyi reg., Bikin env., 6.VIII.[19]82 leg. Plutenko" (CFP). 1 ♀, "Russia - Beytzovo, Khabarovsky territory, Bikinsky district, 27.5.[19]93, V. Kuznetsov lg." (CHH). 1 ♀, "Ussuri, Spasskaja [= Spassk Dalnij, ca. 44.35N 132.48E], 17.IX.1917, Y. Wuorentaus", "Coelambus impressopunctatus Sch., det A. Nilsson" (ZMH). 1 ♂, 1 ♀, "Primorskij Krai, Chasaiskii Rajon, Kefrovaja padj, ozero, 27.VIII.1981, Kusnetzov", "Coelambus vittatus Sharp, Lafer det. 1984" (CMB). 1 ♂, 2 ♀♀, "Russia: Primorskij Kr., 22 km N Vladivostok, Sputnik Stn. ponds, 25/7-92 AN Nilsson" (CAN). 31 exs., "Russia: Primorskij Kr., 6 km NE Ryazanovka, 16.vii.1992, Leg AN Nilsson #5" (CAN, CHF). 18 exs., "Russia: Primorsk Terr., 3 km E Ryazanovka, 12.-14.vii.7.1992, Leg AN Nilsson #30" (CAN, CHF). 1 ♂, "Russia: Primorskij Kr., Ryazanovka, silt ponds, 15/7-92 AN Nilsson" (CAN). 1 ♂, 1 ♀, "Russia: Primorskij Kr., Anisimovka Stn pond, 20/7-92 AN Nilsson" (CAN). 9 ♂♂, 11 ♀♀, "Russia: Primorskij Kr., Anisimovka Stn pond, 20.-21.7-92 AN Nilsson #46" (CAN, CHF). 3 exs., "Russia: Primorsk Terr., 5 km NW Slavyanka, Pond, 13.vii.1992, Leg AN Nilsson" (CAN). 1 ex., "Russia: Primorsk Terr., Ussuriski Res., Kaminushka, 18.-19.vii.1992, Leg AN Nilsson" (CAN). 2 exs., "Russia: Primorsk Terr., 2 km N Khasan Stn., 13.vii.1992, Leg AN Nilsson #37" (CAN). 1 ♂, Russia: "Russia: Primorsk Terr., 5 km W Zanadvorovka, 11.vii.1992, Leg AN Nilsson" (CAN). 10 exs., "Russia or., Primorskij Krai, 5 km E of Kraskino, 13. -16.7.1992, Boukal leg." (CHF). 2 exs., "Ussuri-country m., Sergejevka by Chanka, 28.-30-7.1990, lgt. D. Boukal" (CJS). 1 ♀, "Rußland, Ussuri-Gebiet, Rajon Lazo, 24.VI.1992. leg. Sundukow", "Aleksejewskij chr., S. Seite Bg. Olchowaja, ca. 1550 m, Bergsee-Ufer, ca. 45 km OSO Sergejewka [ca. 43.28N 133.21E]" (MNB). 5 exs., "Rossia or., 26.7.[19]92, Primorskij kraj, Novočugajevka [= Tschugujewka, ca. 44.09N 133.51E, ca 170 km NE Vladivostok], M. Snížek leg." (CJS). 1 ex., "Ussuri 30.7.1989, Dalnerečensk env. [ca. 45.56N 133.43E], on light Jakl leg." (CJS). 1 ♀, "Russia Orient., Primorsky Kray, Lazo vill. envir., 12.VI.[19]82 Plutenko" (CFP). 1 ♀, "Primorskij Kraj, 4.VIII.[19]13, Tumongon [?, illegible]" [Cyrillic] (ZISP). 1 ♀, "Primorskij Kraj, Tumaschon [?, illegible], 2.VIII.[19]13" [Cyrillic] (ZISP). 1 ♂, "Primorskij Kraj, Tumasch... [?, illegible], 4.VIII.[19]13, Tscherskij

leg." [Cyrillic] (ZISP). 1 ♂, 1 ♀, "Primorskij Kraj, A. J. Tscherskij" [Cyrillic], "vittatus Sharp" [hw Zaitzev?] (ZISP). 2 ♂♂, 3 ♀♀, "Nowowladimirowka [44.35N 133.07E], Rajon Iman, leg Tscherskij. 21.VI.[19]11" [Cyrillic], "Coel. vittatus Sharp, Zaitzev det." [hw Zaitzev] (ZISP). 1 ♀, "Kamen-Rybolow [44.44N 132.02E], Chanka-See, S. Ussuri-Gebiet, leg. Tscherskij, 7.V.[19]08" [Cyrillic], "C. vittatus Sh., Zaitzev det." [hw Zaitzev] (ZISP). 1 ex., "Wladiwostok, leg. Gawronskij, 2.VIII.[1]903" [Cyrillic], "Coelambus vittatus Sharp, Zaitzev det." [hw Zaitzev] (ZISP). 1 ♀, "Primorskij Kraj, Station Ugolnaja [near Wladiwostok], leg. Pimskij-Korsakow, 7.VII.[1]914" [Cyrillic] (ZISP). 1 ♂, "At light: Rhyazanovka railway station vicinit., Khazan [= Chasan] distr., south Primorye, Russia, 16.-17.VIII.2000, D. Schigel leg." (ZMUM). 1 ♀, "At light: Tigrovoy settlement, Partizansk distr., south Primorye, Russia, 29.VIII.2000, D. Schigel leg." (ZMUM). 4 exs., "UdSSR, Primorskij Kraj, Baranovskij, 31.7.1990, leg. A. Pütz" (CHF). 4 exs., "UdSSR, Primorskij Kraj, Tschernye Gory, 1.-3.8.1990, leg. A. Pütz" (CHF). 4 exs., "UdSSR, Primorskij Kraj, Ussurijski Sapovednik, 18.VII.1990, leg. A. Pütz" (CHF). From the last three localities further specimens in CAP and CLH. **Inexact label data**: 1 ♀, "Kazakhstan, Gorni Altaj, 25.VI.1991" (CFP). The name "Gorni Altaj" most probably means the Russian "Gorno Altaj Republic" which borders Kazakhstan; a confirmation of this record would be welcome.

Diagnosis: Habitus oblong oval (Fig. 3), resembling that of *H. impressopunctatus*. Body outline in dorsal view with slight discontinuity between pronotum and elytra. Sides of pronotum weakly rounded; posterior angles not rounded, approximately rectangular. Epipleural rim in dorsal view only visible near shoulders and before apex. In lateral view epipleural rim slightly ascending to humeral angle (more or less as in *H. zigetangco* sp.n., Fig. 162). Short and indistinct pubescence present in posterior half of elytra.

Coloration of surface very variable; background colour basically red yellowish brown, provided with darker brownish pattern, diffusely delimited and thus contrasting little with lighter background. Head with two dark brown interocular spots, vertex darkened. Pronotum uniformly coloured or with disc and two spots before base diffusely darkened. Each elytron with four vittae; in posterior half a fifth near margin, but at most indicated as cloudy longitudinal spot; suture darker. In some specimens second and fourth vittae reaching darkened base of elytra, first and third vitta anteriorly abbreviated. Posteriorly vittae fused, third and fourth also in anterior half of elytra. In many specimens, however, vittae anteriorly becoming more and more indistinct far before elytral base, in several ones - e.g. in the holotype of *H. chinensis* - darker pattern almost unrecognizable, which in some cases, however, may be due to age.

Head with clypeal margin not raised. Punctures on clypeus rather sparse and fine becoming denser and coarser posteriorly; vertex impunctate. Clypeal grooves flat. Traces of microreticulation present on clypeus of males, in females a little more extended. Disc of pronotum sparsely punctate, near the margins punctures coarser and denser. Centre of disc in few specimens with a larger puncture or slight longitudinal scratch, but in most specimens absent. Microreticulation absent. Sides of pronotum with distinct rim. Punctation of elytra strongly variable. In principle double, consisting of deeper impressed punctures of large diameter, interspersed with flat small punctures, their diameter at most half of large ones. In most specimens disc of elytra with distance between large punctures less than their diameter or exceeding it only a little. This distance, however, exceeding twice the diameter or even more in Japanese specimens and in those from Taiwan, Shaanxi, and some Korean ones. Larger punctures becoming denser posteriorly, smaller ones less numerous, lacking at apex. Two puncture lines on each elytron, consisting of close larger punctures, but not as strongly impressed as in most *H. impressopunctatus*. A third puncture line indicated near the margin.

Ventral surface black, except reddish brown head and prosternum. Prosternal process darker brown. In some specimens hind margins of metacoxal process and sternites shining through brownish. Epipleura and legs reddish brown. Antennae reddish yellow, articles darkened distally beginning with fifth. Third and fourth article shorter than second and fifth. Prosternal process lanceolate, apex shortly rounded, provided with strong carina, sides narrowly broadened, here with some coarse punctures; no setae observed. Transverse ridge between anterior coxae distinct, two or three transverse grooves weakly indicated anteriorly. Epipleura somewhat broader than

apex of mesotibia; several coarse punctures present. Epipleural carina meeting epipleural rim shortly before shoulders at angle of about 45°. Ligula on inner side of elytron strongly raised anteriorly and abruptly ending posteriorly (Fig. 171). Venter with coarse punctures on sides of metaventrite, anterior parts of metacoxae and sides of first two sternites. Rest of abdomen with punctures somewhat smaller; in some males centre of last visible sternite impunctate. Centre of metaventrite and metacoxal processes with very few small punctures. Metacoxal lines diverging forwards, almost reaching hind margin of metaventrite. Hind margins of metacoxal processes obliquely truncate, central part somewhat prolonged posteriorly (Fig. 161). Middle and hind femora with a row of setiferous punctures. Metatarsal claws of equal length.

♂♂: Median lobe asymmetric in dorsal view (Figs. 83 - 85); parameres as in Figs. 88 - 90. Ventral side of median lobe with long setae which, however, can usually be observed only in liquid. In dry state setae fit to venter of lobe and hidden in a longitudinal groove. Lobe in dorsal view deflected to left, but this deflection only distinct when observed in liquid; when dry lobe almost straight.

Anterior and mid tarsi broadened, but scarcely broader than those of females. Anterior foreclaw strongly broadened and curved, apex broadly rounded (Fig. 149); posterior foreclaw basally broader and longer compared with that of females. Elytra and shiny venter without any microreticulation. The lectotype of *H. chinensis* has the protarsomeres (Fig. 147) less broadened than males from other regions (Fig. 148, lectotype of *H. vittatus*).

♀♀: Polymorphic: Shiny females with microreticulation restricted to apex of elytra; one female from "China: Liaoning, CWBS 114", and another one from "Korea, Gottsche", "Söul 8.[18]84" have a shiny dorsal surface, which is, however, weakly microreticulate all over; third morph matt, not shiny at all; seems not to be abundant; surface strongly microreticulate, diameter of larger punctures reduced, smaller punctures sparse. These matt females resemble strongly the matt morph var. ♀ *lineellus* of *H. impressopunctatus*, and cannot be separated from these without dissection, in particular if both species are found together. FALKENSTRÖM (1932: 192) has been misled and described a matt female *H. impressopunctatus* as var. ♀ *opacus* of *H. chinensis* (see FERY 1995: 1054). Ventral surface of first two morphs shiny, weakly reticulate on sides of metaventrite, metacoxae and last four visible sternites. Matt morph with reticulation not distinctly stronger. Gonocoxae strongly variable (Figs. 93 - 96), gonocoxosternum as in Fig. 99.

Measurements: TL: 4.3 - 5 mm, MW: 2.2 - 2.7 mm.

Notes on the Japanese specimens: Japanese specimens (e.g. the lectotype of *H. vittatus*) with pattern on elytra darker than continental ones, almost black (see also SHARP 1884: 442) and thus contrasting more strongly with background (Fig. 4). Habitus in most specimens a little more rounded and vaulted. On elytra, larger punctures coarser, with distance between them exceeding twice their diameter or even more; more smaller punctures interspersed. Near suture a puncture line indicated, which is almost imperceptible in continental specimens because of the denser punctation.

According to SHARP (1884: 442) *H. vittatus* is "more closely punctate" than *H. chinensis*. The study of the types, however, revealed the contrary, the lectotype of *H. chinensis* being more densely punctate.

Discussion: The types of *H. chinensis* and *H. vittatus* indeed differ strongly with respect to external morphology, and it is quiet understandable that SHARP (1882, 1884) has described both as distinct species. ZAITZEV (1953: 136) tried to separate both taxa by means of the reticulation of the head and the number of vittae on the elytra. I cannot confirm his observations and, in addition, I suspect that he has not studied Japanese specimens. BALFOUR-BROWNE (1947: 439) united both after a study of the male genitalia. Having studied the female genitalia of several specimens from diverse localities I came to the preliminary opinion that the species might be

separable nevertheless (see remarks on *H. chinensis* in NILSSON 1995: 45). Since that time, however, I have examined many more populations and got an impression of the strong variability not only in external morphology, but also in the male and female genitalia. This is why I presently support the view of BALFOUR-BROWNE (1947), but cannot exclude that it might have to be revised in the future, in particular, when methods of molecular biology are applied.

Distribution: China: Xinjiang, Sichuan, Nei Mongol, Heilongjiang, Jilin, Liaoning, Hebei, "Manchuria", Shaanxi, Jiangxi, Zhejiang, Taiwan; South Korea, North Korea, Japan, Russia (Far East, Gornoj Altaj?), and other countries in eastern Asia.

WU (1937: 208) recorded *H. chinensis* from "China: Kiukiang, Peiping, S. Mongolia". I assume that with "S. Mongolia" WU (1937) meant what today is known as the Chinese "Autonomous Region Nei Mongol" (Inner Mongolia). GUÉORGUIEV (1972: 32) cited Wu's record and interpreted, however, "S. Mongolia" not as belonging to China, but as (southern) part of Mongolia, an opinion which I believe to be incorrect. In addition, it must be remarked that GUÉORGUIEV (1965: 130; 1968b: 24; 1969: 60; 1972: 32) presented several other records of *H. chinensis* from Mongolia, and figured a median lobe in lateral view (1965: 120) which undoubtedly does not belong to *H. chinensis*, but to *H. urgensis*. Finally, all specimens determined by Guéorguiev as *H. chinensis* proved to be *H. urgensis* (see below). All these observations show that Guéorguiev has misinterpreted *H. chinensis*, and that most probably *H. chinensis* is unknown from Mongolia.

Hygrotus (*Coelambus*) *parallellogrammus* (AHRENS, 1812)

Dytiscus parallellogrammus AHRENS 1812: 11.
Dytiscus parallelogrammus AHRENS; SHARP 1882: 405.
Hygrotus parallelogrammus (AHRENS); GANGLBAUER 1892: 452. - BALFOUR-BROWNE 1934: 148. - NILSSON & HOLMEN 1995: 36.
Coelambus parallelogrammus (AHRENS); ZIMMERMANN 1930: 100. - ZAITZEV 1953: 136. - FERY 1995: 1053.
Coelambus parallellogrammus (AHRENS); ÁDÁM 1996: 60.
Hygrotus parallellogrammus (AHRENS); NILSSON 2001: 208.
Coelambus distinctus FENG 1936: 7. - GSCHWENDTNER 1939: 31. - FERY 1995: 1053. (**syn.n.**)
Hygrotus distinctus (FENG); NILSSON 1995: 46, 2001: 206.

Type material: *Dytiscus parallellogrammus*: According to HORN et al. (1990: 15) part of Ahrens' collection has come to the "Naturwissenschaftliches Museum Kulmbach" (Germany), another part "via Rektor Drude/Hettstädt und Rottmersleben an H. Hegewald/Hakenstedt". I have not been able to locate the types, which most probably must be regarded as lost. See also the notes on the whereabouts of the Ahrens collection in ASKEVOLD (1987: 632). **Type locality**: "Magdeburg" (Germany) and "Vienna" (Austria).

Coelambus distinctus: **Holotype** (♀): Should be conserved in the collection of the Nankai University, Tientsin; not studied, most probably lost. **Type locality**: "Peiping" [= Beijing], China.

Material studied: **Mongolia**: 1 ♀, "Mongolia, Bajanchongor aimak [= Bayanhonger aymag], 4 km S von somon Zinst [*], Tujn gol, 1480 m, Exp. Dr. Z. Kaszab, 1964", "Nr. 200, 26.VI.1964", "impressopunctatus Schall., det V. Guéorguiev"; specimen, found together with several *H. impressopunctatus* (HNHM) (first record for Mongolia). **Afghanistan**: 2 ♀♀, "Afghanistan, Kuschke, coll. Hauser 1896", "coll. Hauser" (NMW). 1 ♂, "Ost-Afghanistan, 69 40'L/34 35'B, Khurd Kabul 2000 m, SO v. Kabul, 11.6.1971, leg C. Holzschuh" (CGW). **Kyrgyzstan**: 5 exs., "Jssyk-Kul, Ton-Fluss" [= Tong river, ca. 130 km S Alma-Ata, see SCHÜTZE & KLEINFELD 1997: 143], "Collect. Hauser" (NMW, CGW) (first record for Kyrgyzstan). **Uzbekistan**: 1 ♂, 2 ♀♀, "Dargan-ata, Chiwa [*], ... [illegible] 3.VII. [19]10", "C. parallelogrammus Ahr. Zaitzev det." (ZISP) (first record for Uzbekistan). **Turkmenistan**: 1 ♂, 2 ♀♀, "Achshabad" [Cyrillic], "Zoological Institute RAN. St. Petersburg, Russia", coll. Olsufiew (ZISP). 1 ♂, "Tr. Casp. [= Transcaspia], Aschabad." (MNHN). 5 exs., "Buchara, Repetek [ca. 38.35N 63.11E], 4. 1900, coll. Hauser" (HNHM). 2 exs., same label data (NMW, CGW). 2 ♂♂, 2 ♀♀, "Buchara, Repetek 5.1900, Coll. Hauser", one specimen with additional "Coelambus parallelogr.", another one with "Coelambus parallelogrammus Ahr." (NHMP). 10 exs., "Transcaspia, Kisil-Arwat [ca. 38.58N 56.16E], F. Hauser 1898" (NMW, CGW). 12 exs., "Transcasp., Imam-baba", "Collect. Hauser" (NMW, CGW). 2 ♀♀, "Transcap, Imam-baba [= Imambaba, ca. 36.45N 62.25E]" (NHMP). 1 ex., "Transcasp., Merw [= Mary, ca. 37.35N 61.50E], 4. 1990, coll. Hauser" (NMW,

CGW). 1 ex., "Transcaspia, Dortkuju [W Mary, ca. 37.38N 61.18E], 5. 1900, coll. Hauser", "coll. Dr. J. Fodor" (HNHM) (first record for Turkmenistan). **Kazakhstan**: 5 exs., "Kasachstan, Taldy-Kurgan-Gebiet, Ili, 500 m NN, 43°58'N, 79°39'E, 04.VI.1993, leg. V. Lukhtanov" (MNE). 1 ♀, "Kasachstan, Taldy-Kurgan-Gebiet, Koktal, 44°06'N, 79°47'E, 500 m NN, 6.-8.VI.1993, leg. V. Lukhtanov" (MNE). 12 exs., "Kasachstan, Tschimkent-Geb., Syr-Darja river, Baltakyl, 05.VI.1995, leg. V. Lukhtanov" (MNE). 2 ♂♂, "Kasachstan, Alma-Ata-Gebiet, Taschkarasu, 600 m NN, 43°48'N, 79°39'E, leg. V. Lukhtanov, 5.-8.VI.1993" (MNE). 1 ♂, "Kasachstan, Alma-Ata-Gebiet, Pristan Dubinskaja, 550 m NN, 43°45'N, 80°13'E, 15.-18.VI.1993, leg. V. & A. Lukhtanov" (MNE). 3 ♀♀, "SE Kasachstan: 23.V.1997, Kysyl-Kum Desert, 60 km E Amu-Darja, leg. Dolin (K-2/97)" (NMW). 1 ♂, 1 ♀, "C. Kazakhstan, near Aktjubinsk, 22/07/[19]85" (CFP). 1 ♂, 1 ♀, "26.6.1999 Urdzhar env., E Kazakhstan", "S Tarbagatai (ca. 47,05/81,37)" (CHF). 1 ♀, "24.6.1999 S Altaj, NE Kazakhstan, Bukhtanma riv.", "Svinchatka vill. (ca. 49,09/84,09)" (CHF). **Russia**: 1 ♂, "Jakutsk", "B. Poppius", "309" (ZMH). 1 ♀, "Right bank of [river] Lena, near Jarmonsk pass [near Yakutsk], Czerski [18]91", "Coelambus parallelogrammus Ahr. Zaicev det." (see ZAITZEV 1910: 27) (ZISP). 4 ♂♂, 10 ♀♀, "Siberia, 28.V.-28.VI. 82, Novosibirsk oblast, Karasuk, 53.5N. 78E., R.B. Angus" (CRA). 14 exs., "Russia W Siberia, Novosibirsk reg., Karasuk 5-X-1983" (CFP). **Estonia**: 1 ♂, 1 ♀, "Estl. Pärnu [ca. 58.22N 24.31E], 25.7.-4.8.1938. Palm." (ZMH) (first record for Estonia).

For detailed descriptions of *H. parallellogrammus* see e.g. ZIMMERMANN (1930: 100), and NILSSON & HOLMEN (1995: 36). The male and female genitalia are illustrated in Figs. 31, 36, 42, 48.

Discussion: *Hygrotus parallellogrammus* (AHRENS, 1812) has never been recorded from China. On the other hand *Hygrotus distinctus* (FENG, 1936) seems not to have been found again since its description, and all authors after FENG (1936) who cited this taxon seem not to have studied the holotype. In FERY (1995: 1053), however, I already suspected that *H. distinctus* might be a junior synonym of *H. parallellogrammus* after having compared the female genitalia of *Hygrotus distinctus* figured by FENG (1936: 8, fig. 15) (see Figs. 43, 49 in the present work) with those of *H. parallellogrammus* (Fig. 42). The study of all eastern Palearctic *Hygrotus* reveals that no species has female genitalia which resemble even slightly those of *H. parallellogrammus*. These observations and in particular the first record for Mongolia support my present conclusion that *Coelambus distinctus* FENG, 1936 is a junior subjective synonym of *Dytiscus parallellogrammus* AHRENS 1812. Thus, *H. parallellogrammus* formally can be recorded from China for the first time.

Distribution: China: Beijing; Mongolia, Afghanistan, Kyrgyzstan, Uzbekistan, Turkmenistan, Russia (East and West Siberia, South European Territory), Kazakhstan, and other countries in Asia, and Europe.

Hygrotus (*Coelambus*) *saginatus* (SCHAUM, 1857)

Hydroporus saginatus SCHAUM 1857: 154. - SHARP 1882: 404.
Coelambus saginatus (SCHAUM); ZIMMERMANN 1930: 102. - ZAITZEV 1953: 138. - FERY 1992: 343, 1995: 1050.
Hygrotus saginatus (SCHAUM); NILSSON 2001: 209.
Hydroporus mulsanti PEYRON 1858: 400.
Coelambus elevatus SHARP 1882: 403. - ZIMMERMANN 1930: 102.

Type material: *Hydroporus saginatus*: **Lectotype** (♀) designated by FERY (1992: 138), stored in the ZSM. **Type locality**: Zante [= Sakinthos, island west of Peloponnisos], Greece.

Hydroporus mulsanti: **Lectotype** (present designation): ♂, "Tarsous" [printed], "Hydrosporus mulsantis Peyron" [sic! yellow, most probably a curatorial label], "Lectotype, Hydroporus mulsanti Peyron, 1858, des. H. Fery 2002" [red] (AUB). Parts of PEYRON's (1858) description (see below) lead to the assumption that the author had more than one specimen before him, and a mixed type series cannot be excluded. **Type locality**: "Tarsous (Caramanie)", Southern Turkey. PEYRON (1858: 401) provided: "Elle ce prend communément avec la précédente", which means *H. confluens*. For this species the following locality is given (PEYRON 1858: 399): "Dans les marécages, près du pont du Cydnus". "Cydnus" is the ancient name of the Pamuk river which crosses Tarsus.

Coelambus elevatus: **Holotype** (♀) stored in the BML. See FERY (1992: 343) for more information. **Type locality**: "Egypt".

For detailed descriptions of *H. saginatus* see e.g. ZIMMERMANN (1930: 102), and FERY (1992: 345). The male and female genitalia are illustrated in Figs. 53, 57, 61, 65.

Distribution: Kazakhstan, Turkmenistan, and other countries in Asia, Europe, and North Africa.

Systematic notes: In FERY (1995: 1051) the following species are included in the *saginatus*-group: *H. saginatus*, *Hygrotus fresnedai* (FERY, 1992), *Hygrotus armeniacus* (ZAITZEV, 1927), *H. semenowi*, *Hygrotus corpulentus* (SCHAUM, 1864), and *H. urgensis*. The males of the first four species have metatarsal claws of unequal length, the posterior one being shortened, thickened and curved, the anterior one simple, and this in contrast e.g. to BALFOUR-BROWNE (1940: 198) (see also the notes under *H. polonicus*). In addition the females of these species are well characterised by the long finger-like prolongation of the gonocoxae. *H. corpulentus* as well as *H. urgensis* lack these characteristics, but have been included in the *saginatus*-group because of their habitus, which resembles strongly that of the other species. In the meantime, however, I have come to the opinion that both species should be grouped together with *H. impressopunctatus* and *H. chinensis*.

Hygrotus (*Coelambus*) *urgensis* (JAKOVLEV, 1899)

Coelambus urgensis JAKOVLEV 1899: 507. - ZIMMERMANN 1930: 103. - FENG 1933a: 24, 1933c: 102. - WU 1937: 208. - ZAITZEV 1953: 138. - GUIGNOT 1956: 395. - FERY 1992: 349, 1995: 1051.
Hygrotus urgensis (JAKOVLEV); NILSSON 1995: 45, 2001: 209.
Coelambus corpulentus (SCHAUM); ZIMMERMANN 1919: 151. (misidentification)
Coelambus chinensis SHARP; GUÉORGUIEV 1965: 130, 1968b: 24, 1969: 60, 1972: 32. (misidentification)

Type locality: Northern Mongolia, Changai [*].

Type material: FERY (1992: 349) noted that the types of *Coelambus urgensis* have been untraceable. In the meantime, however, I have been able to study at least one specimen which belongs to a possible series of several syntypes. It cannot be excluded that further syntypes will be identified in the future which, however, might in part not belong to the species under consideration. **Lectotype** (present designation): ♀, "Nordl. Mongolei. [= northern Mongolia], Changai [*], Leder." [printed], "bré. [? illegible] lernaeus" [hw Reitter], "Coelambus urganensis m. n. sp. i. l." [hw Reitter], "urgensis Jakovl - 1898" [hw Reitter?], "Coll. Reitter", "Guignot det., 1956, Coelambus urgensis Jakovl." [in most parts hw Guignot, rest printed], "Lectotype, Coelambus urgensis Jakovlev, 1899, des. H. Fery 2002" [red] (HNHM). This specimen no doubt has been studied by JAKOVLEV (1899: 507). He even cited the name "*C. urganensis*" (JAKOVLEV 1899: 505) of the original Reitter label and corrects it to "*urgensis*" (JAKOVLEV 1899: 506). It is assumed that Reitter in 1898 has given Jakovlev the opportunity to study his specimen(s) and communicated at the same time the name *C. urganensis* (or Jakovlev has found this name on the label). See also the remarks in GUIGNOT (1956: 395): "Coelambus urgensis Jakovl. Nord de la Mongolie; Changai, Sibérie. - Rare espèce dont les présents exemplaires proviennent de la région d'origine et peut-être même de série typique."

Additional material studied: **China**: GANSU: 18 exs., "Oasis Satschshou [*], 3.-8.IV.1894, expedition Roborowskiy & Kozlow" [Cyrillic]; one specimen with additional "chinensis Sh." (ZISP, CHF). These specimens have been already recorded in FERY (1995: 1051), and with "H. Fery, in litt." in NILSSON (1995: 45). **Mongolia**: 1 ♂, "Mongolia bor., Changai [*], Leder" [printed], "Coll. Reitter", "Coelambus urgensis Jakovl., Guignot det., 1956" [in most parts hw Guignot]; specimen rather teneral (HNHM). I am not sure if this specimen - although most probably belonging to the same series as the lectotype - has been studied by Jakovlev. 1 ♀, "Mongolia, Gobi Altaj aimak [= Govi-Altay aymag], Fluß Zavchan gol [= Dzavhan river], ca 30 km SO von Somon Zargalan [*], 1700 m, Exp. Dr. Z. Kaszab, 1966", "Nr. 699., 16.VII.1966", "impressopunctatus Shall., det. V. Guéorguiev" (HNHM). 1 ♀, "Dsapchyn river, upper course [*], NW Mongolia, Kirichenkow leg. 6.-7.IX.[19]27", "Coelambus mongolicus Jak., det. V. Guéorguiev 1974" (ZISP). 2 ♂♂, 7 ♀♀, "Mongolia, Archangaj aimak [Arhangay aymag], NO Ecke des Sees Ogij nur [*], 1350 m, Exp. Dr. Z. Kaszab, 1964", "Nr. 249., 2.VII.1964.", "chinensis Sharp, det. V. Guéorguiev", one specimen with additional "Coelambus ♀ chinensis Sharp, det. V. Guéorguiev 1964" (HNHM). 1 ♂, 1 ♀, same label data, the male with additional "Coelambus ♂ chinensis Sharp, det. V. Guéorguiev 1964" (MRTO). 1 ♀, "Mongolia: Chentej aimak [= Hentiy aymag], 15 km O von Öndörchaan [*], 1 km S vom Kerulen [*], 1000 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 328., 30.VII.1965.", "impressopunctatus Schall., det. V. Guéorguiev" (HNHM). 2 ♀♀, "Mongolia, Chendaj aimak [= Hentiy aymag], Kerulen [*] river, 45 km E Bajon-obo [*], Kerschner leg. 28.VII.[1]971" [Cyrillic], "Zoological Institute RAN. St. Petersburg, Russia" [yellow], specimens very teneral (ZISP). 2 ♂♂, "Mongolia: Suchebaator aimak [= Sühbaatar aymag], Chadatin-bulan [*], 60 km N von Somon

Bajanterem [*], 950 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 343., 1.VIII.1965.", "chinensis Sharp, det. V. Guéorguiev" (HNHM). 1 ♀, "Shamar, Selenga aimak (reg.), north Mongolia, 30.VI.1983, S Kuzmin leg." (ZMUM). **Russia**: FERY (1992: 349) recorded several specimens with label text "Sibirien, Reitter. Leder." According to LEDER (1894a) this text relates to the region around Irkutsk (see also the Appendix).

There is much evidence that GUÉORGUIEV (1965: 130; 1968b: 24; 1969: 60; 1972: 32) has misinterpreted *H. chinensis*, and all his records of this species from Mongolia relate to *H. urgensis* (see notes under *H. chinensis*).

For detailed descriptions of *H. urgensis* see ZIMMERMANN (1930: 103), and FERY (1992: 350). The male and female genitalia are illustrated in Figs. 82, 87, 91, 97.

Distribution: China: Gansu, "China: Mongolia"; Mongolia, Uzbekistan, Russia (East Siberia), Kazakhstan. NILSSON's (1995: 45) record for Qinghai is erroneous.

Hygrotus (*Coelambus*) *semenowi* (JAKOVLEV, 1899)

Coelambus semenowi JAKOVLEV 1899: 504. - ZIMMERMANN 1930: 103. - FENG 1933a: 24, 1933c: 102 (partim). - WU 1937: 208 (partim). - ZAITZEV 1953: 137. - FERY 1995: 1047.
Hygrotus semenowi (JAKOVLEV); NILSSON 1995: 46 (partim), 2001: 209.

Type locality: "Chinae septentrionalis provincia Gan-su (G. Potanin! 1.VII.1886). - Nonnulla specimina ♂ ♀ (coll. P. a Semenow et mea)" (JAKOVLEV 1899: 505). According to BEREZOWSKI & BIANCHI (1891: XXX) the collector G. Potanin stayed between May, 23rd and August, 30th 1886 - the period of the collecting time - near the village Io-dsam-pu (also called Tschodsono), which is situated at the eastern border of the Min-Shan mountain range. This village is about 5 km from Dangchang [ca. 34.02N 104.19E], N Wudu, ca. 240 km S Lanzhou (see FERY 1995: 1047).

Type material: **Lectotype** ♀ (ZISP), designated by FERY (1995: 1047).

For detailed descriptions of *H. semenowi* see JAKOVLEV (1899: 504) and FERY (1995: 1047). The male and female genitalia are illustrated in Figs. 56, 60, 64, 68.

Distribution: China: Gansu.

NILSSON (1995: 46) gave for *Hygrotus semenowi* (JAKOVLEV) the following remarks: "According to the literature, it occurs in N China from Gansu to Beijing, and in Primorye [Russia]. However, some of these records probably are based on misidentifications (H. Fery, in litt.)". After having studied a large number of *Hygrotus* from the respective area I must add that Jakovlev's three types are the only existing specimens of *H. semenowi* and that no entomologist after Jakovlev and before FERY (1995) has ever studied real *H. semenowi*. All records - except those of the types - are misidentifications of *H. chinensis* or simple citations of literature.

Hygrotus (*Coelambus*) *unguicularis* (CROTCH, 1874)

Hydroporus unguicularis CROTCH 1874: 73. - SHARP 1882: 813.
Hygrotus unguicularis (CROTCH); NILSSON 1995: 46, 2001: 209.
Coelambus mongolicus JAKOVLEV 1899: 506. - ZAITZEV 1910: 27. - ZIMMERMANN 1930: 105. - FENG 1933a: 24, 1933c: 102. - WU 1937: 208. - ZENG. 1989: 3.

Type material: *Hydroporus unguicularis*: **Holotype** (♂), not studied. Although CROTCH (1874: 74) clearly states that he has studied only one male, ANDERSON (1983: 192) designated a lectotype: "Museum of Comparative Zoology, Harvard University, Cambridge, Mass. A male No. 8137 I designated as lectotype." **Type locality**: "British Columbia", Canada.

Coelambus mongolicus: **Holotype** (♂), not located; ZAITZEV (1910: 29) has also not been able to find "the [single] typical specimen ... which seems not to be completely mature". According to JAKOVLEV (1899: 507) the holotype was stored in the coll. Semenow. It seems, however, not to exist any more in this collection (pers. communication by B. Katajev). **Type locality**: "Mongolia bor.-occid.: inter Ulagom [= Ulankom = Ulaangom, ca. 49.58N 92.03E] et Uluchem [?] (G. Potanin! 1879)".

Material studied: **Mongolia**: 9 exs., "Mongolia, Gobi Altaj aimak [= Govi-Altay aymag], Fluss Zavchan [= Dzavhan river] gol ca 30 km SO von Somon Zargalan [*], 1700 m, Exp. Dr. Z. Kaszab, 1966", "Nr. 699, 16.VII.1966", "mongolicus Jak., det. V. Gućorguiev", one specimen with additional "Hygrotus (Coel.) ♂ unguicularis (Crotch) det A. Nilsson 1985", another with "Hygrotus (Coel.) ♂ unguicularis (Cr.) det A. Nilsson-[19]86" (HNHM). **European Russia**: 2 ♂♂, "Vorkuta, 25.VIII.1998, S. Kuz'mina leg." (ZMUM). 1 ♂, 1 ♀, "Komi Republic, river Kolva [a tributary of river Usa], 22.VII.2000, Y. Rogovtsova leg." (ZMUM). This is the first record of the species from Europe.

For detailed descriptions of *H. unguicularis* the reader is referred to ZIMMERMANN (1930: 105) and ZAITZEV (1972: 146) (in both works under the name *H. mongolicus*), and LARSON et al. (2000: 192). The male and female genitalia are illustrated in Figs. 69, 72, 75, 78. This Holarctic species still is stored in many collections under the name *H. mongolicus*.

Distribution: China: Nei Mongol, "China: Mongolia"; Mongolia, Russia (Far East, East Siberia, North European Territory), North America.

Hygrotus (*Coelambus*) *zigetangco* sp.n.

Type locality: Zige Tangco, ca. 31.50N 90.30E, a lake W Amdo, and N Dongqiao, about 270 km N Lhasa, Nagqu prefecture, Tibet, China.

Type material: **Holotype**: ♂, "China: Tibet 9.VIII., 90 km W Amdo, Cigetang [= Zige Tangco] 4400 m, leg. X. Guo 1998", "Holotype, Hygrotus (Coelambus) zigetangco sp.n., Fery det. 2002" [red] (NMW). **Paratypes**: 2 ♂♂, 4 ♀♀, same label data as the holotype (NMW). 2 ♂♂, 2 ♀♀, "China: Tibet 14.VIII., 25 km W Amdo, 4400 m, Couna Lake - brook, leg. X. Guo 1998" (NMW). 4 ♂♂, 5 ♀♀, "China, N Sichuan, 25 km NNE Zhangla, 33.04N/103.45E, 4100 m, J. Rejsek leg., 4.-5.viii.2001"; four females matt, one shiny (CJS). 1 ♀, "China - NW Sichuan, Sertar, 3200 m [ca. 32.13N 100.10E], Rejsek 13.7.1995", "Hygrotus sp., female, Det AN Nilsson - [19]96"; a matt female (CJS). All paratypes with the respective red label.

Additional material studied: **Pakistan**: 1 ♀, "Y.N.I.E. [= Yale North India Expedition (?)], L 73 Chushol [most probably = Chushal, ca. 34.41N 73.30E]", "Pond below village 10 Aug 1932, Dytiscidae [underlined]", "F. Guignot det., 1953, Coelambus n. sp." (MZL). This female is not designated as paratype because it is a little smaller (TL 3.8 mm) than the Chinese specimens, has the gonocoxae somewhat narrower, and because the locality could not be determined beyond doubt.

Diagnosis: Habitus oblong oval (Fig. 2), sides of elytra more or less evenly rounded; outline in dorsal view with discontinuity between pronotum and elytron. Sides of pronotum almost straight and weakly converging forwards in posterior three quarters, anteriorly strongly curved inwards. Posterior angles not rounded, slightly obtuse. In dorsal view epipleural rim (or lateral margin of elytron) visible only at base of elytron because sides of elytra turned inwards almost over whole length. In lateral view epipleural rim distinctly ascending towards humeral angle (Fig. 162), but on no account as strongly as e.g. in *H. caspius* (Fig. 163). Apically elytron obliquely truncate, this, however, not perceptible in dorsal view. Very short and indistinct setae on posterior half of elytra.

Head yellowish, but more reddish than pronotum; vertex and two interocular spots piceous. Pronotum yellowish, with slight tendency to reddish; centre of disc with dark brown spot of varying extent. Each elytron of dirty light yellow and with up to four vittae, which are rather indistinct, in some specimens very weakly developed and in part or even totally absent; suture darkened. Vittae not reaching base of elytra, but at least in one specimen studied distinctly more prolonged forwards than in Fig. 2. Some specimens with rudiments of a fifth vitta in posterior half near side margin. Elytra transparent to large extent, hind wings shining through.

Head with clypeal margin not raised. Punctation anteriorly weak and sparse, punctures coarser anteriorly on frons, but less dense; punctures becoming coarser and a little denser towards vertex. Clypeus and anterior half of frons with microreticulation consisting of small round cells; reticulation becoming weaker posteriorly, and absent on posterior part of frons and vertex. Two

large, but flat clypeal grooves between eyes, situated well behind fore margin. Pronotum not reticulate, punctures on disc a little coarser and denser than on head, coarser near margins; two small areas near side margins almost impunctate. Dark brown spot on centre of disc provided with one large puncture or impression. Sides of pronotum with a distinct rim. Elytra without reticulation; punctation almost even, punctures somewhat coarser and denser than on disc of pronotum; diameter of punctures a little variable, but punctation not double, no single coarser punctures interspersed among the normal punctation between puncture lines. Distance between punctures a little larger than their diameter. Each elytron with two distinct puncture lines, consisting of coarse and irregularly arranged punctures. Some larger punctures near the margin indicate a third line.

Ventral surface black in large parts, head, prosternum, epipleura, and legs yellowish; gula, base of prosternum, prosternal process, and tarsi darkened in part; metacoxal processes apically, and a small area before apex of last visible abdominal segment brownish. Antennae yellowish with articles progressively darkened distally, beginning with fifth; third and in particular fourth article shorter than second and fifth. Prosternal process lanceolate, apex rounded; provided with a longitudinal carina, sides flat and broadened, here with some coarse punctures, setae not perceptible; cross-section more or less tectiform. No transverse ridge between anterior coxae. Epipleura anteriorly rather broad, more or less as broad as apex of mesotibia; without reticulation, provided with some scattered small punctures (Fig. 166). Epipleural carina (near humeral angle) meeting epipleural rim before shoulders at an angle of about 45° (Fig. 166). Inner side of elytra in posterior half provided with a carina near margin and this carina having a ligula in posterior part which is strongly raised anteriorly, and abruptly descending posteriorly (Fig. 169). Metaventrite and -coxae reticulate and less shiny, sides provided with coarse punctures; metaventrite with some small punctures near middle or almost impunctate in part; metaventral processes with some small punctures. Abdominal segments with reticulation distinct only laterally, punctation on first segments coarse laterally, less so in middle; last visible segment anteriorly with punctation more evenly distributed, almost impunctate before apex. Hind margins of metacoxal processes strongly sinuate, central part somewhat prolonged posteriorly (Fig. 159). Metacoxal lines diverging forwards, ending far before hind margin of metaventrite (Fig. 159). Middle of hind femora provided with a row of coarse punctures. Metatarsal claws equal in length.

♂♂: Dorsal surface shiny; first three pro- and mesotarsomeres distinctly broadened; third protarsal tarsomere almost as broad as second one. Protarsal claws of almost equal length, strongly prolonged and broadened (Fig. 146), shaped like slender leaves. Median lobe (Fig. 70) and parameres (Fig. 73) surprisingly long (note the reduced scale!); lobe in lateral view strongly curved in central part, here corrugated membrane visible to an unusually large extent; groove on upper surface provided with numerous very short bristles before apex (not shown in Fig. 70).

♀♀: Dimorphic; matt morph with pronotum and elytra densely punctate, punctures smaller, space between punctures strongly reticulate; epipleura reticulate also. Head totally reticulate. Vittae on elytra broadened, fused, forming more or less large cloudy pattern, although vittae still perceptible; pattern darker and reaching further into first third of elytra than in shiny morph. Pro- and mesotarsi simple. Gonocoxae as in Fig. 76, gonocoxosternum as in Fig. 79.

Measurements: TL: 3.9 - 4.5 mm, MW: 1.9 - 2.2 mm; TL not exceeding 4.2 mm in specimens from the locus typicus.

Discussion: With respect to external morphology *H. zigetangco* sp.n. resembles *H. polonicus*. The male and female genitalia, however, indicate a close relationship to *H. novemlineatus*, and *H. unguicularis*. According to the features given above it clearly groups together with the last two species within ZIMMERMANN's (1930: 104) "Gruppe III". *H. zigetangco* sp.n. can be

separated from both as follows: bigger than *H. novemlineatus* and distinctly smaller than *H. unguicularis*; punctation on elytra less dense; protarsal claws of almost equal length; centre of median lobe in lateral view distinctly more curved.

Distribution: China: Tibet, northern Sichuan; Pakistan: North-West Frontier Province (?). Zhangla is situated about 260 km N Chengdu and ca. 70 km SW Nanping; Sertar is situated ca. 400 km NE Chengdu. The distances between the three different localities are: Amdo - Sertar: ca. 900 km, Sertar - Zhangla: ca. 350 km. All three localities belong to the Qinghai-South-Tibet zoogeographical region ("W-B" in JÄCH & JI 1995b: 10); of these, Zhangla is situated at the eastern border to the Eastern Central China region ("SC-A" in JÄCH & JI 1995b: 10). The Pakistani locality is situated about 1700 km west of Amdo, and may still belong to an extended Qinghai-South-Tibet zoogeographical region or to the Qinghai-Tibet Plateau ("W-A" in JÄCH & JI 1995b: 10). Future collecting in northern Pakistan, Kashmir, northern India, and southwestern Tibet may contribute to a better understanding of the distribution of this species.

Derivatio nominis: This name of the new species refers to Lake Zige Tangco.

Hygrotus (*Coelambus*) *marklini* (GYLLENHAL, 1813)

Hyphydrus marklini GYLLENHAL 1813: 689. - SHARP 1882: 398.
Coelambus marklini (SHARP); ZIMMERMANN 1930: 105. - ZAITZEV 1915: 248, 1953: 140. - BALKE & FERY 1993: 90.
Hygrotus marklini (GYLLENHAL); GANGLBAUER 1892: 453. - NILSSON & HOLMEN 1995: 36. - NILSSON 1995: 46, 2001: 207.
Hydrocoptus mixtus MOTSCHULSKY 1860b: 515.
Hydroporus astur SHARP 1882: 468.
Coelambus awajewi JAKOVLEV 1899: 508. - FENG 1933a: 23, 1933c: 101. - WU 1937: 207.
Hydroporus lutzi REITTER 1908: 215.
Coelambus canadensis FALL 1919: 11.
Hydrocoptus nivalis MOTSCHULSKY 1853: 5. (nomen nudum)
Hydrocoptus nitidulus MOTSCHULSKY 1853: 5. (nomen nudum)

Type material: *Hyphydrus marklini*: Types not studied. **Type locality**: Öland, Sweden.

Hydrocoptus mixtus: **Lectotype** (present designation): ♂, "Hydrocoptus mixtus Fisch [= Fischer de Waldheim], Des. Kirgis [= region in Kazakhstan]" [hw Motschulsky], a label without any sign, "1050." [red], "Lectotype, Hydrocoptus mixtus Motschulsky, 1860, des. H. Fery 2002" [red]; the lectotype lacks the antennae and most legs or parts of them (ZMUM). **Paralectotypes**: 3 ♀♀, originally glued onto the same transparent card as the lectotype. The specimens were separated by me, and each pin provided with copies of the original labels (ZMUM). 1 ♀, 1 ex., "fl. [= river] Turgai [most probably = Thorgay, ca. 49.37N 63.29E]" [red, almost illegible, hw Motschulsky?], "Hydroporus mixtus Fisch. testaceus mihi, Camp. [= campus = region] Kirgis." [hw Motschulsky], "1048." [red]; both specimens originally glued onto the same transparent card, separated by me, and each pin provided with copies of the original labels; one specimen almost totally damaged by Dermestidae (ZMUM). 1 ♀, "mixtus Fisch., Des. K." [hw Motschulsky], "Hist. Coll. (Coleoptera), Nr. 10128, Hydroporus marklini (Gyll.), mixtus Fisch., Des. K., Zool. Mus. Berlin" (MNB). All paralectotypes with the respective red label. **Type locality**: Kazakhstan, "Steppes des Kirghise" (in MOTSCHULSKY (1853: 3, 5) is additionally given "E." = "Lacs Elton [ca. 49.06N 46.39E] et Bogdo [ca. 47.58N 46.48E]").

Hydroporus astur: For this taxon see BALKE & FERY (1993: 90). **Type locality**: Cantabria, Spain.

Coelambus awajewi: **Lectotype** (present designation): ♀, "Gansu, 1886. I. VII, Potanin" [Cyrillic, hw? in part printed], "Coelambus Awaewi A. Jak., det. A. Jakowlew" [in most parts hw Jakovlev, rest printed], "Lectotype, Coelambus awajewi Jakovlev, 1899, des. H. Fery 2002" [red]; specimens standing under *Coelambus marklini* ab. *pallens* AUBÉ in coll. Zaitzev (ZISP). **Paralectotype**: 1 ♀, same label data as the lectotype, except the second one, and the red paralectotype label (ZISP). JAKOVLEV (1899: 508) communicated two males instead of two females. I am sure, however, that he used these females for his description. ZAITZEV (1953: 140) was the first who stated the synonymy of *Coelambus awajewi* JAKOVLEV, 1899 and *Hyphydrus marklini* GYLLENHAL, 1813 without, however, doing this formally. **Type locality**: "Chinae septentrionalis provincia Gan-su (G. Potanin! 1.VII.1886). - 2 specimina ♂ (coll. P. a Semenow et mea)" (JAKOVLEV 1899: 508). The type locality is the same as for *H. semenowi*; for more information see under this species.

Hydroporus lutzi: **Lectotype** (present designation): ♂, "Rp. Tau. [?] 12/VI[18]90" [not hw Reitter], "Galizisch 12.VI., Podolien, 1890" [not hw Reitter], "coll. Reitter", "Holotypus 1908, Hydroporus (s. str.) Lutzi Reitter" [red margin, mounted by Z. Kaszab between 1950 and 1960; pers. communication by O. Merkl], "Lectotype, Hydroporus lutzi Reitter, 1908, des. H. Fery 2002" [red] (HNHM). **Paralectotype**: 1 ♂, same label data as the lectotype, but "Paratypus 1908, Hydroporus (s. str.) Lutzi Reitter", and the red paralectotype label (HNHM). **Type locality**: Galizisch-Podolien [= landscape in western Ukraine, between Vinnitsa and Kamenets-Podol'skiy].

Coelambus canadensis: Types not studied. The synonymy of this taxon with *H. marklini* has been established by NILSSON & HOLMEN (1995: 36). **Type locality**: Winnipeg, Manitoba, Canada.

Additional material studied: **China**: QINGHAI: 3 exs., "China-Qinghai, Nan Shan, Caka Nun [*], 3300-4200 m, 9.-13.VII.1994, B. Zvaric. Coll. Hendrich" (CHF, further specimens in CLH). TIBET: 1 ♀, "Tibet: Tingri, 15.000 ft. 6 [?].VII.1924., Maj. R.W.G. Hingston.", "Everest Exp., Brit. Mus./1924 - 386." (BML). This specimen has the elytra with an unusual weak punctation, but amongst the other specimens from the Tingri plateau are also two specimens with a very weak punctation. 19 exs., "Tibet, Tingriebenen, N28°34'39,7/E86°36'52,7; 4400 m, 3.-5.VIII.1998, lg. Jäger" (SMTD, CHF). 2 exs., "Tibet, Yamtso-ufer bei Nagartze, N28°58'31,9/E90°24'6,0; 4450 mNN, 29.VII.1998; leg. O. Jäger" (SMTD, CHF). **Mongolia**: 17 exs., "Mongolia: Central aimak [= Töv aymag], Kerulen [*], 45 km O v. Somon Bajandelger [*], 1340 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 479., 25.VIII.1965.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 1 ex., "Mongolia: Central aimak [= Töv aymag], 25 km E von Somon Lun [*], 1200 m, Exp. Dr. Z. Kaszab, 1968", "Nr. 1148, 25.VII.1968", "marklini Gyll., det. V. Guéorguiev" (HNHM). 13 exs., "Mongolia: Chentej aimak [= Hentiy aymag], 20 km SW von Somon, Norovlin [*], 900 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 448., 19.VIII.1965.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 1 ex., "Mongolia, Bajanchongor aimak [= Bayanhonger aymag], Tujn gol [= Tüyn river], 1250 m, bei somon Bogd [*], Exp. Dr. Z. Kaszab, 1964", "Nr. 195, 25.VI.1964.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 17 exs., "Mongolia, Archangaj aimak [= Arhangay aymag], NO Ecke des Sees, Ogij nur [*], 1350 m, Exp. Dr. Z. Kaszab, 1964", "Nr. 249., 2.VI.1964.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 2 exs., "Mongolia, Gobi Altaj aimak [= Govi-Altay aymag], Fluß Zavchan gol, ca 30 km SO von Somon Zargalan [*], 1700 m, Exp. Dr. Z. Kaszab, 1966", "Nr. 699., 16.VII.1966", "marklini Gyll., det. V. Guéorguiev" (HNHM). 2 exs., "Mongolia: Südgobi aimak [= Ömnögovi aymag], Nojon nuruu [*], Grenzposten, Ovot Chuural, 1500 m, Exp. Dr. Z. Kaszab, 1967", "Nr. 828, 21.VI.1967", "marklini Gyll., det. V. Guéorguiev" (HNHM). 4 exs., "Mongolia: Suchebaator aimak [= Sühbaatar aymag], Chadatin-bulan [*], 60 km N von Somon Bajanterem [*], 950 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 343., 1.VIII.1965.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 1 ex., "Mongolia, Uburchangaj aimak [= Övörhangay aymag], Changaj Gebirge [*], Ongijn gol, 10 km ONO [= ENE] von Arbajcher [*], 1800 m, Exp. Dr. Z. Kaszab, 1964", "Nr. 220, 29.VI.1964.", "marklini Gyll., det. V. Guéorguiev" (HNHM). 2 ♂♂, 1 ♀, "Nordl. Mongolei, Leder", "Coel. Awajewi Jakov., Coll. Reitter"; the female with additional "Coelambus Awajewi Jakow. 1898" [hw Edm. Reitter] (HNHM). 1 ex., "Village Duschrim charyn, chabu, north-western Mongolia, Potanin, 30.v.[18]99" [Cyrillic] [not found on any map], "C. avajevi Jak., Zaitzev det.", "Coelambus avajevi Jak., det. V. Guéorguiev 1976" (MRTO). **Turkmenistan**: 1 exs., "GR. Balachan, Dschebell, F. Hauser 1898", "Coll. Hauser", "Coelambus marklini Gyll., Zaitzev det." (NMW) (first record for Turkmenistan). **Kazakhstan**: 1 ♀, "10154" [historical museum number], "Kirgisicus Motsch, Des. Kirg." [hw Motschulsky], "Zool. Mus. Berlin"; the name "*kirgisicus*" has not been found in any publication (MNB). 5 exs., "Mt. Ulu-Tau [= mountain range, ca. 47 - 49N 65.30 - 67.30E]" [red, almost illegible, hw?], "Hydroporus subnitidulus [the "sub" seems to be added subsequently] mihi, Mt. Ulu-Tau Camp. [= campus = region] Kirg. [= region in Kazakhstan]" [hw Motschulsky], "1047." [red]; all specimens glued onto a single transparent card, almost totally damaged by Dermestidae, sex not discernible (ZMUM). 1 ♀, "Des. Kirg." [red, hw Motschulsky], "Hydroporus impluviatus Motsch, Des. Kirg." [hw Motschulsky], "1051." [red]; specimen strongly teneral (ZMUM). For the nomina nuda (*sub*)*nitidulus* and *impluviatus* [= *nivalis*?] see ZAITZEV (1915: 248), and NILSSON (2001: 279). **Estonia**: 2 exs., "Estonie" (IRSN). 1 ex., "Estonia", "Marklini, Estonia", "Coel. Marklini Gyll., Coll. Reitter" (HNHM) (first record for Estonia).

For detailed descriptions of *H. marklini* see e.g. ZIMMERMANN (1930: 105), and NILSSON & HOLMEN (1995: 36). The male and female genitalia are illustrated in Figs. 106, 109, 112, 115.

Distribution: China: Gansu, Qinghai, Tibet, "N and NE China", "China: Mongolia"; Mongolia, Uzbekistan, Russia, Kazakhstan, and other countries in Asia, Europe, and North America.

Hygrotus (*Coelambus*) *inscriptus* (SHARP, 1882)

Coelambus inscriptus SHARP 1882: 404. - ZIMMERMANN 1930: 106. - ZAITZEV 1953: 140. - GUÉORGUIEV 1970: 257. - BRANCUCCI 1981: 229 (designation of lectotype).
Hygrotus inscriptus (SHARP); OMER-COOPER 1954: 258. - AL-HOUTY & ANGUS 1999: 184. - NILSSON 2001: 207.
Coelambus uzbekorum ZAITZEV 1953: 140. - GUÉORGUIEV 1970: 257. (**syn.n.**)
Hygrotus uzbekorum (ZAITZEV); NILSSON 2001: 209.

Type material: *Coelambus inscriptus*: **Lectotype**: ♂, "Lectotype" [round label, violet margin], "Coelambus inscriptus n.sp. Persia" [hw Sharp], "Persia" [hw Sharp], "Persia" [printed], "Type 203" [hw Sharp], "Sharp coll. 1905-313", "Lectotype, Coelambus inscriptus Sharp, des. M. Brancucci" [red label, hw Brancucci] (BML). **Paralectotype**: ♂, "Paralectotype" [round label, blue margin], "203" [hw Sharp], "Mesopotamia, Milligen", "Sharp coll. 1905-313", "Coelambus inscriptus Shp., det. Sharp" [hw?, not Sharp!], "Paralectotypus" [red, printed] (BML). **Type locality**: "Persia".

Coelambus uzbekorum: **Holotype** (♂): "Chairowot [*], Chiwa [*], 5.VIII.1926, Tratnikow" [Cyrillic], "Holotypus Coelambus uzbekorum Zaitzev 1953" [red, hw Nilsson], "Zool. Inst. St. Petersburg" (ZISP). In ZAITZEV (1953: 141) the date is given as "1924" instead of "1926", the reason for this discrepancy is unknown. **Type locality**: Chairowot, near oasis Chiwa, Uzbekistan.

Additional material studied: **Uzbekistan**: 1 ♀, "Uzbekistan, 25 km S Bukhara, 18.V.[19]95, Melnik lgt." (CFP). 1 ♂, 1 ♀, "Uzbekistan, 25 km S Bukhara, 20.V.1995" (CHF). 1 ♀, same label data, but "17.V.1995" (CHF). **Turkmenistan**: 1 ♀, "USSR, Turkmen. SSR, 40 km E of Ashkhabad, Kara-Kum desert, Annau env. 22.6.1983, Vit. Kubán leg." (CHF). 1 ♀, "Turkmenistan, 50 km N of Ashkhabad, 58°33'E, 38°22'N, 100 m, 3.VIII.1992, No. L67, leg. M. Hreblay, Gy. László and G. Rokay" (CHF, further specimens in HNHM). 1 ex., "Turkmenistan, 60 Km N Ashchabad, 24-IX-[19]90 Melnik leg." (CFP). 2 ♂♂, "30.4.1990 Turkmenistan, Kara-kum desert, 60 km N Achshabad" (CJS). 21 exs., "Turkmenia, 14.4.1993, Repetek [ca. 38.35N 63.11E], Snižek lgt." (CJS). 2 ♀♀, "Turkmenia bor., Dargan Ata env. [ca. 40.51N 61.57E], 5.6.1992, Lgt. Snížek" (CHF, further specimens in CLH). 1 ♂, "Turkmenistan, Kopet-Dagh Mts., 800-1500 m, valley of the rivers Ipay-Kala and Polnt-Kala, 59°54-57'E, 38°13-15'N, 30.06.-04.07.1992, No. L63, leg. Gy. Fáblán, B. Herczig, A. Podlussány and Z. Varga" (CHF, further specimens in HNHM). 2 exs., "Turkmenistan: 24.4.1995, SW Kerki [ca. 37.49N 65.12E], Seit env., salt lake, leg. Dolin (8)" (NMW) (first record for Turkmenistan).

BRANCUCCI (1981: 228) figured the median lobe of *H. inscriptus* and the habitus of a specimen which has the external longitudinal black vitta reduced to two spots. The elytral pattern is quite variable and also I have studied specimens with even four vittae. ZAITZEV (1953: 140) described *H. uzbekorum* after a single matt female, and remarked that it resembles *H. inscriptus*. The females of *H. inscriptus* indeed are dimorphic, the matt form being somewhat rarer, but existing over the whole area of distribution. The holotype of *H. uzbekorum* equals in all respects matt females of *H. inscriptus*, and the genitalia also coincide perfectly. For detailed descriptions of *H. inscriptus* see e.g. ZIMMERMANN (1930: 106), and ZAITZEV (1972: 140). The male and female genitalia are illustrated in Figs. 35, 40, 41, 47.

Distribution: Uzbekistan, Turkmenistan, and other countries in Asia, and North Africa.

Hygrotus (*Coelambus*) *nigrolineatus* (STEVEN, 1808)

Hyphydrus nigrolineatus STEVEN 1808: 33.
Coelambus nigrolineatus (STEVEN); ZAITZEV 1953: 141.
Hygrotus nigrolineatus (STEVEN); NILSSON & HOLMEN 1995: 38. - NILSSON 2001: 208.
Hydroporus lautus SCHAUM 1843: 187. - SHARP 1882: 406.
Hygrotus lautus (SCHAUM); GANGLBAUER 1892: 451.
Coelambus lautus (SCHAUM); ZIMMERMANN 1930: 107.
Hydrocoptus punctulatus MOTSCHULSKY 1853: 6. (nomen nudum)

Material studied: **Mongolia:** 1 ♂, 1 ♀, "Mongolia: Chovd aimak [= Hovd aymag], Jamatin Dolon, ca. 40 km N von Somon Manchan, am SW Ecke des Char us nuur [*], 1200 m, Exp. Dr. Z. Kaszab, 1966", "Nr. 673, 11.VII.1966.", "nigrolineatus Stev., det. V. Guéorguiev" (HNHM). These records confirm GUÉORGUIEV's (1968a: 288) record. **Russia**: 1 ♂, "Salzsee [= saline lake] bei Presnogorkovsk [*]" [red, almost illegible, hw?], "Hydroporus punctulatus, Sibiria Motsch" [hw Motschulsky], "1056." [red]; specimen almost totally damaged by Dermestidae (ZMUM) (see ZAITZEV 1915: 249, and NILSSON 2001: 279 for this nomen nudum). 1 ♀, "Hydrocoptus crassiusculus

Motsch, Rus. mer. or." [hw Motschulsky], "1054." [red] (ZMUM). 1 ♀, "Bogdo [ca. 47.58N 46.48E]" [hw?], "bimaculatus m." [hw Motschulsky], "1055." [red] (ZMUM). See ZAITZEV (1915: 249) for the names *crassiusculus* and *bimaculatus*: "nom. mus.!"

For detailed descriptions of *H. nigrolineatus* see e.g. ZIMMERMANN (1930: 107, sub *Coelambus lautus*), and NILSSON & HOLMEN (1995: 38). The male and female genitalia are illustrated in Figs. 105, 108, 111, 114.

Distribution: Mongolia, Kazakhstan, Russia (West Siberia, South European Territory), several European countries.

Hygrotus (*Coelambus*) *confluens* (FABRICIUS, 1787)

Dytiscus confluens FABRICIUS 1787: 193. - SHARP 1882: 408.
Hygrotus confluens (FABRICIUS); GANGLBAUER 1892: 451. - BALFOUR-BROWNE 1934: 148. - NILSSON & HOLMEN 1995: 38. - NILSSON 1995: 46, 2001: 206.
Coelambus confluens (FABRICIUS); ZIMMERMANN 1930: 108. - KAMIYA 1940: 118. - LAFER 1989: 237.

Material studied: **India**: 1 ♀, "Ind. Mus., Phagu to Kufri, alt. 9000-10000ft., Simla Hills [ca. 31.05N 77.14E], 21.V.[19]16. Annandale & Kemp.", "Coll. Gschwendtner", "confluens F., det. Gschwendtner" [hw Gschwendtner] (OLML). **Pakistan**: 7 exs., "N Pakistan, Shogran [ca 50 km NE Mansehra, ca. 34.47N 73.36E], Kaghan valley, J. Rejsek 28.-30.7.1998"; pool in alpine zone, without forest (pers. communication by J. Šťastný) (CJS) (first record for Pakistan). **Afghanistan**: 1 ♀, "Rašíd [= Rashid, ca. 100km WSW Meymaneh, 35.46N 63.43E], 18.5.1964, 700m (17)", "N. Afghanistan, Prov. Maimana [= Meymaneh], coll. O. Jakeš" (MMB). 1 ♀, "Herat-Gazergha [ca. 10 km NE Herat, 34.22N 62.13E], 23.7.1964, 1000 m (54)", "N. Afghanistan, Prov. Herat, coll. O. Jakeš" (MMB). These records confirm that of GUIGNOT (1959: 320). **Kazakhstan**: 2 ♂♂, "Kazakhstan: Chimkent Region, W Tian Shan, Leg. J. Cooter", "Dzhabagly river, ca 6 km E Dzhabagly vill. [ca. 40.20N 70.40E], 9.vi.1999. ca 1350 m." (CHF). 1 ♀, "3.6.1996 S Kazakhstan, Talass Mts., ca. 20 km E Burnoye, 900 m, Dolin leg., (N 24) (ca. 42°37'/70°58')" (CHF). 4 exs., "23.5.1997 S Kazakhstan, Kysyl-Kum desert, 86 km SW Arys, Syrdarya reg., leg. Dolin, (K-2/97) (ca. 42°/68°15')" (NMW) (first record for Kazakhstan).

For detailed descriptions of *H. confluens* see e.g. ZIMMERMANN (1930: 108) and NILSSON & HOLMEN (1995: 38). The male and female genitalia are illustrated in Figs. 119, 123, 128, 132.

Distribution: India (Himachal Pradesh), Pakistan, Kashmir, Afghanistan, Uzbekistan, Kazakhstan, Turkmenistan, and other countries in Asia, Europe, and North Africa.

The species has been recorded from China ("Manchuria") by KAMIYA (1940: 118); this record was repeated afterwards by LAFER (1989: 237) and NILSSON (1995: 46). After a careful study of distributional data in the literature I have come to the opinion that the distribution of *H. confluens* reaches its eastern limit in SE Kazakhstan, Uzbekistan, N Afghanistan, N Pakistan, Kashmir, and N India (Himachal Pradesh). Thus this species cannot occur in NE China, and Kamiya's record must have been caused by a misidentification. Most probably he has studied some *H. caspius* (see the "Discussion" under *H. caspius*). This is why at present *H. confluens* must be excluded from the Chinese list.

Hygrotus (*Coelambus*) *caspius* (WEHNCKE, 1875)

Hydroporus caspius WEHNCKE 1875: 234. - SHARP 1882: 407.
Coelambus caspius (WEHNCKE); ZAITZEV 1908b: 61, 1928: 11, 1951: 55, 1953: 142. - ZIMMERMANN 1920: 64, 1930: 108. - KAMIYA 1934: 181, 1935: 7, 1940: 118. - GUÉORGUIEV 1970: 257. - KONEV 1976: 56. - LAFER 1989: 237.
Hygrotus caspius (WEHNCKE); NILSSON 1995: 46, 2001: 205.
Coelambus reitteri ZAITZEV 1908a: 268, 1953: 142. - GUÉORGUIEV 1965: 131, 1968b: 24, 1970: 258, 1972: 33.
Coelambus trilineatus FENG 1936: 6. - GSCHWENDTNER 1939: 32. - ZAITZEV 1953: 144. - ZENG 1989: 3. **(syn.n.)**
Hygrotus trilineatus (FENG); NILSSON 1995: 45, 2001: 209.
Coelambus confluens (FABRICIUS); KAMIYA 1940: 118. - LAFER 1989: 237. - NILSSON 1995: 46. (misidentification)

Type material: *Hydroporus caspius*: **Lectotype** (present designation): ♂, a very small rectangular label, signification unknown, "Ballion" [hw Wehncke], "Astrachan" [hw Wehncke] {**1**}, "Muséum Paris, Oberthür, ex Wehncke", "Lectotypus, Hydroporus caspius Wehncke, 1875, des. H. Fery 2002" [red] (MNHN). Wehncke's description gives no information on the number of specimens studied. The lectotype of *H. caspius* has the apex of the median lobe slightly damaged, and the left antenna and the left tibia as well as the protarsus are lacking. **Type locality**: Astrakhan, Russia.

Coelambus reitteri: **Lectotype** (present designation): ♂, "Irkutsk government, Malta station {**21**}, Siberian railway, VI.1907, D. A. Smirnow" [Cyrillic], "Syntype, Coelambus reitteri Zaits. 1908" [red, hw?], "Zoological Institute RAN. St. Petersburg, Russia" [yellow], "Lectotypus, Coelambus reitteri Zaitzev, 1908, des. H. Fery 2002" [red] (ZISP). **Paralectotypes**: 2 ♂♂, 6 ♀♀, same label data as the lectotype; 1 ♀, "Nordl. Mongolei., Changai [*] {**25**}, Leder", "reitteri Zaitz." [hw?], "Syntype, Coelambus reitteri Zaits. 1908" [red, hw?], "Zoological Institute RAN. St. Petersburg, Russia" [yellow]; the paralectotypes with the respective red labels (ZISP). ZAITZEV (1908a: 268) provided no information on the number of the "Malta station" specimens. **Type locality**: Malta station [= Mal'ta, ca. 52.51N 103.33E], ca. 75 km NW Irkutsk, Russia.

Coelambus trilineatus: **Types** not located (see FENG (1936: 7): holotype, allotype, and two paratypes), most probably lost. **Type locality**: "Shensi" [= Shaanxi] {**34**}, China.

Additional material studied: **China**: QINGHAI: 4 exs., "China-Qinghai, Nan Shan, Caka Nun [*] {**37**}, 3300-4200 m, 9.-13.VII.1994, B. Zvaric. Coll. Hendrich" (CHF, further specimens in CLH). 1 ♀, "Central-China, Richthofen Geb. [*], Umg. Tenkar [*] {**36**}, 11.V.1951, P. Eichinger leg.", "Coelambus reitteri Zaitz, det. G. Wewalka [19]75" (CGW). NEI MONGOL: 7 exs., "China: Nei Mongol, 22.7.1998, Wengniute Qi Co.[ca. 43.15N 119.40E] {**31**}, ca. 480 m, ca. 120 km NNE Chifeng, Schönmann, Ji, Wang (CWBS 329)" (for "Weng-niu-te" see KAMIYA 1935: 8) (NMW). **Mongolia**: 7 exs., "Mongolia: Uvs aimak [Uvs aymag], SW Rand des Sees Uvs nuur [*] {**24**}, 63 km O von der Stadt Ulaangom, 790 m, Exp. Dr. Z. Kaszab 1968", "Nr. 1022, 26.VI.1968", "reitteri Zaitz., det. V. Guéorguiev" (CHF, further specimens in HNHM). 1 ex., "Mongolia: Uvs aimak [Uvs aymag], S Rand des Sees Örög nuur [*] {**23**}, 1500 m, Exp. Dr. Z. Kaszab, 1968", "Nr. 1066, 5.VII.1968", "reitteri Zaitz., det. V. Guéorguiev" (HNHM). 4 exs., "Mongolia, Archangaj aimak [=Arhangay aymag], NO Ecke des Sees Ogij nur [*] {**26**}, 1350 m, Exp. Dr. Z. Kaszab 1964", "Nr. 249, 2.VII.1964", "reitteri Zaitz., det. V. Guéorguiev" (CHF, further specimens in HNHM). 4 exs., "Mongolia: Central aimak [= Töv aymag], Kerulen [*], 45 km O v. Somon Bajandelger [*] {**28**}, 1340 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 479., 25.VIII.1965.", "reitteri Zaitz., det. V. Guéorguiev" (HNHM). 1 ex., "Mongolia: Suchebaator aimak [= Sühbaatar aymag], 27 km S von Bajanterem [*] {**29**}, VII-VIII.1966, leg. Gy. Márton", "Hydroporus sp.n., det. V. Guéorguiev 1976" (specimen very dark, inner parts also, genitalia lacking; it must have been treated in an inadequate manner) (MRTO). 1 ex., "Mongolia: Cojbalsan aimak [= Choybalsan aymag = Dornod aymag], Somon Chalchingol [*] {**30**}, 600 m, Exp. Dr. Z. Kaszab, 1965", "Nr. 409., 13.VIII.1965.", "reitteri Zaitz., det. V. Guéorguiev" (HNHM). 1 ♂, "Dschargalante [*] {**27**}, central Chalcha [*], Mongolia, Kozlow, 23.VII.[1]926" [Cyrillic], "Coll. Gschwendtner", "caspius Wehnk [sic!], det. Gschwendtner" (OLML). 1 ex., same label data, but "Coelambus caspius Wehn., det. Gschwendt.", "Coelambus caspius Wehn., det. V. Guéorgiuev 1972" (MRTO). 2 exs., "Mongolia bor., Reitter.", "Museum Paris, ex Coll. Oberthur", one specimen with additional "Coelambus caspius" [hw?], standing after the lectotype of *H. caspius* (MNHN). 1 ex., "Mongolia b., Reitter.", "11", "Coelambus Reitteri" (CJS). 2 exs., "Mongolia bor., Reitter.", one specimen with additional "O. Leonhard", and "Coelambus Reitteri Zaitz. n.sp." (DEI). **Turkmenistan**: 1 ex., "Krasnovodsk {**8**}, 8-16.III.[1]900, K.O. A... [illegible]" [Cyrillic], "Coelambus caspius Wehncke., det. A. Jakowlew." (an extremely teneral specimen) (ZISP). **Kazakhstan**: 1 ♀, "Temir district, Ural region, R. Tschatyrly [*] {**9**}, 6.VI.[19]08, D. Borodin & B. Uvarov" [Cyrillic] (ZISP). 1 ♂, "Temir district, Ural region, Kok-dshida valley (canyon) [*] {**10**}, 20.VI.[19]08, D. Borodin & B. Uvarov" [Cyrillic] (ZISP). 1 ♀, "Temir district, Ural region, G. Dshilandy [not found on any map], 9.VI.[19]08, D. Borodin & B. Uvarov" [Cyrillic] (ZISP). 1 ♂, "Prov. Syrdariensis, village Perovsk, Baigakum near Dshulek [*] {**12**}, 3.VII.[19]07, D. Glasunov." (ZISP). 1 ♂, "Chelkar [*] region {**11**}, Drugai steppe, big Barsuki [*], 22.VI.[19]07, N.W. Androsow" (see ZAITZEV 1908b: 61, 62; here is additionally recorded "Indersk" [*] {**7**}) (ZISP). 1 ♀, "Environs Uralsk {**5**}, 10.VII.[19]06, B. Uvarov" [Cyrillic] (ZISP). 1 ♂, 1 ♀, "Karaganda region, Kazakhstan, Akche-tau [*] {**17**}, 1954, S. Nikulin leg."; male studied by me, female by P. Petrov (ZMUM). 1 ♀, "E Kazakhstan, 5 km NE Matay [ca. 45.56N 78.46E] {**19**}, 400 m, 28.VI.2001, leg. W. Schawaller" (SMNS). 2 ♂♂, "Region east of lake Balkhash {ca. **19**}, salty puddle, 25.7.1965, A. Ponomarenko leg.", "Coelambus confluens F., A. Ponomarenko det."; both females studied by P. Petrov (ZMUM). KONEV (1976: 56) recorded: "Karaganda {**14**}, Karkaralinsk [= Qarqaraly] {**15**}, Balkash town {**18**}, Aktogay {**16**}. Common in saline and fresh waters." **Russia (East Siberia)**: 5 exs., "Sibirien [*] {**21**}, Reitter. Leder." (CHF). 3 exs., same label data (ZMH). 3 exs., same label data (IRSN). 2 exs., same label data (MZL). 1 ex., same label data (MRTO). 2 exs., "Sibirien., Reitter. Leder.", "Coll. Gärtner", one specimen with additional "Coelambus caspius Wehnke [sic!]" (DEI). 1 ex., "Sibirien., Reitter. Leder.", "Coll. Kraatz", "Coelambus caspius Shaug. [?]", "Zimmermann det.", "Coelambus caspius Wehncke" (DEI). 1 ♂, "Sibirien., Reitter. Leder.", "Coll. Gschwendtner",

"caspius Wehnk [sic!], det. Gschwendtner" (OLML). 1 ♂, "Sibirien., Reitter. Leder.", "Munganast [?]", "Coelambus caspius Wehncke, det. L. Gschw." (OLML). 1 ex., "Sibirien, Reitter. Leder.", "Reitteri Zaitz" [hw?], "Coelambus reitteri Zaitz., det. G. Wewalka [19]73" (CGW). 1 ex., "Sibirien, Reitter. Leder.", "Coelambus reitteri" [hw?], "Zaitz" [hw?], "Collektion [sic!] Prof. Dr. C. Bosch", "Senckenberg-Museum, Frankfurt/Main", "Coelambus reitteri Zaitz, det. G. Wewalka [19]75" (CGW). 7 exs., "Transbaikalien, Bez. Tschita, O-Ufer Sun-Torej [ca. 50N 116E] {**22**}", "Schlammflächen, Lagunen, 16./17.VI.1994", "leg. Krause & Jäger, Staatl Museum für Tierkunde Dresden" (CHF, further specimens in SMTD). 2 exs., "Transbaikalien, Bez. Tschita, Steppensee Barun-Torej [ca. 50N 115.2E] {**22**}, Feuchtwiese", "Käscherfang, 15.VI.1994", "leg. Krause & Jäger, Staatl Museum für Tierkunde Dresden" (CHF, further specimens in SMTD). 1 ex., "Sibirien, R. Tschita, Lagunen a. SO-Ufer des Sees Barun-Torej {**22**}, 15.VI.1994, leg. Jäger" (CHF, further specimens in SMTD). **Russia (South European Territory and West Siberia)**: 1 ♂, "Ross. or., Astracha." {**1**}, "Coelamb. confluens", "caspius Weh... [almost illegible]" (ZISP). 1 ex., "n.sp.?", "Astrachan", "Coll. Kraatz", "Zimmermann det." (DEI). 1 ♂, "Russia: Astrakhan Rn., Nishniy Baskuntyak [ca. 48.13N 46.48E] {**2**}, Bogdo Z., 12/5-[20]01 A. Nilsson" (CAN). 1 ♀, "Russia: Volgograd Obl. SW of Lake Elton [ca. 49.06N 46.39E] {**2**}, shallow steppe pond with clayish water. 11:V:2001: Leg. J. Bergsten" (CJB). 1 ♀, "Dzariszia [= Dzaritzia = Stalingrad = Volgograd] {**3**}, 3284 - 2." [reddish brown] (ZISP). See also ZAITZEV (1928: 27): "between Samara and Sarepta" {**4**}, and BECKER (1892: 63): "Sarepta environs" {**3**}. 1 ex., "Orenburg" {**6**} (see also ZAITZEV 1908b: 62) (DEI). 1 ♂, "Omsk, near Omsk city {**13**}, 5.7.1938, Ivan Telishev leg." (ZMUM). 1 ♂, "26.7 1994 Russia, Aleisk, Western Siberia, 300 m, ca. 52.29N 82.45E, M. Danilevsky leg." {**20**} (CPM).

The following diagnosis relates to western populations (Kazakhstan, Turkmenistan, Russia: southern European territory, western Siberia), differences of eastern ones (China, Mongolia, eastern Siberia) being treated afterwards in the "Notes on the synonymy of *H. reitteri*".

Diagnosis: Habitus oblong oval (Figs. 7, 9, 10); sides of elytra more or less evenly rounded, but curved more strongly near base; outline in dorsal view with noticeable discontinuity between pronotum and elytra. Sides of pronotum almost straight, strongly converging forwards. Posterior angles not rounded, obtuse. In dorsal view epipleural rim visible only near shoulders and before apex because sides of elytra strongly turned inwards almost over whole length. (Fig. 167). Posterior half of elytra provided with very short and indistinct setae. In lateral view epipleural rim strongly ascending towards humeral angle (Fig. 163). Elytra before apex with slight oblique truncation.

Head yellowish, vertex and two fused interocular spots on head dark brown. Pronotum almost unicoloured yellowish with brownish shadow before base. Elytra pale yellowish, pronotum and head of reddish yellow. Four reddish brown vittae on each elytron, which are abbreviated anteriorly, not reaching base. Second vitta reaching until anterior fourth of elytra, first one scarcely exceeding posterior half; third and fourth one only present in posterior half, but in some specimens continuation of fourth line into anterior half indicated by small longitudinal spot. Third and fourth vittae often fused behind middle, first to third vittae broadened apically and in some specimens fused. Suture dark brown, colour of elytra beside suture often reddish yellow. Pattern of elytra strongly variable, vittae often strongly reduced in width and length, in particular fourth and third ones interrupted, and colour lighter, thus contrast to pale background reduced. Elytra transparent in large extent.

Clypeal margin not raised, slightly emarginate. Punctation on clypeus sparse and fine, becoming denser and coarser posteriorly; on vertex very sparse and fine. Punctation before vertex and on centre of frons very dense, here surface somewhat impressed. Clypeal grooves flat, of variable extent. Clypeus anteriorly with weak microreticulation extending on two small areas beside eyes. Pronotum not microreticulate, punctation near margins denser and coarser, on two small areas right and left of discal centre and two other areas near side margin with punctation sparser and finer. Centre of disc with more or less developed impression or longitudinal scratch. Sides of pronotum with distinct rim. Elytra without microreticulation. Punctures smaller than on pronotum, rather dense, distance between punctures equalling more or less their diameter. Punctation not expressly double, however, in basal third space between puncture lines interspersed with few coarse punctures; these coarse punctures markedly less numerous than in

H. confluens. Each elytron with lines of punctures beside suture, and two further lines which coincide more or less with second and fourth vittae; a third puncture line near side margin. In posterior two thirds of elytra on first and third vittae traces of puncture lines recognizable.

Ventral surface black, in some specimens, however, sternites dark brown, and in particular last visible abdominal segment lighter brown before apex. Head and centre of prosternum dark brown, prosternal process and hind margin of metacoxal processes a little lighter brown; sides of prosternum yellowish brown. Legs and antennae yellowish, articles of antennae very weakly darkened distally beginning with fifth or sixth, last article somewhat darker; third and fourth article shorter than second and fifth. Prosternal process lanceolate, apex shortly rounded. Longitudinal carina narrow, keel-like, sides broadened, provided with small transverse carinae; no setae present. Process between coxae strongly sculptured, transverse ridge imperceptible. Epipleura not broad (Fig. 167), narrower than apex of mesotibia; punctation fine and dense, as on disc of elytra. Epipleural carina forming a very acute angle with epipleural rim, meeting rim at shoulders (Fig. 167). Ligula on inner side of elytron strongly raised anteriorly, abruptly ending posteriorly (Fig. 170). Sides of metaventrite, metacoxae, and first two sternites very coarsely punctate. Centre of metaventrite with very few and very small punctures, on metacoxal processes punctures somewhat coarser and less sparse. Third to fifth sternite with finer punctures, in particular at sides, last visible segment with punctures denser and a little coarser, apex without punctures. Hind margins of metacoxal processes almost straight, in middle shortly protruded backwards (Fig. 160). Distance between metacoxal lines small posteriorly, strongly diverging forwards, ending short before hind margin of metaventrite. Middle and hind femora without distinct row of coarse punctures. Metatarsal claws of equal length. Hind tibiae in both sexes somewhat curved.

♂♂: Microreticulation present on sides of metaventrite and metacoxae, and on last three sternites; venter shiny. Median lobe variable; in western as well as in eastern populations specimens can be found with median lobe's shape varying in a range which is indicated in Figs. 116, 117. Parameres less variable (Fig. 121). Pro- and mesotarsi scarcely broadened, not more than in females. Protarsal claws simple, equal to those of females.

♀♀: Similar to males, except microreticulation on venter which is more extended, in particular abdomen more strongly reticulate and thus less shiny. Gonocoxosternum (Fig. 130) apically rounded, else similar to those of *H. confluens* (Fig. 132). Most specimens of the western populations show a distinct depression before the apex of the gonocoxae (Fig. 125) which often is less prominent or even lacking in eastern populations. This feature, however, is variable as well as the general shape of the gonocoxae (compare Figs. 125, 126), and cannot be used to separate both populations as specifically different.

Measurements: Western populations: TL: 3.2 - 3.7 mm, MW: 1.7 - 2.05 mm; types of *H. reitteri*: TL: 3.4 - 3.8 mm, MW: 1.9 - 2.0 mm; Mongolian and Chinese specimens: TL: 3.2 - 3.9 mm, MW: 1.85 - 2.2 mm.

Notes on the synonymy of *H. reitteri*: ZAITZEV (1908a: 268) provided as characteristics which shall separate *H. reitteri* from *H. caspius*: "... body shorter, margins of pronotum much more converging forwards, punctation of elytra more distinct, punctures near the scutellum larger (although not as large as in *H. confluens*), the black lines on the elytra broader, more expanded anteriorly, posteriorly almost always fused. Underside with coarser punctures, in particular on the anal sternite." (translation by the present author). Almost 50 years later ZAITZEV (1953: 142; English translation 1972: 149, 150) wrote: "... differing from it [*H. caspius*] in the slightly more rounded sides and in the constant development of black lines on the elytra ... Fine punctation on the elytra less delicate and markedly sparser; ... Hind coxae, sides of first two sternites and anal sternite with stronger dots ...".

According to my studies I can confirm that the types of *H. reitteri* have the vittae on the elytra darker, almost black, somewhat broader, and reaching more forwards (in particular the fourth vitta, see Fig. 10), and the puncture lines on the first and third vittae also reaching more forwards than in western populations. However, I cannot find that the punctures on parts of the ventral surface are coarser and the sides of the pronotum more strongly converging forwards than in western specimens. Additionally, it must be remarked that Zaitzev's specimens are not remarkably large, but even smaller than the western ones studied.

The study of the rest of the eastern specimens revealed that the elytral pattern is rather variable, and that among these specimens several can be found which have the vittae even more strongly reduced than those from western specimens. The punctation of the upper surface is also quite variable. The only difference between both populations seems to be the darker elytral pattern, which is almost black in eastern, but - at least in older material - more reddish brown in western specimens.

Finally I have not been able to find distinct and constant differences in the male and female genitalia between both populations. All these observations seem to me to support ZIMMERMANN's (1920: 64) suggestion that *H. reitteri* must be treated as a junior subjective synonym of *H. caspius*.

Comparative notes: *H. caspius* on a first glance can be confused easily with *H. confluens* and *H. pallidulus* (AUBÉ). But both can be separated with some certainty from *H. caspius* even without dissection:

H. pallidulus has the head uniformly pale yellowish, without any darker markings, and the spaces between the puncture lines on disc of elytra lack any larger punctures.

H. confluens has dark markings on the head like *H. caspius*, but the spaces between the puncture lines on the disc of the elytra are provided with several larger punctures, distinctly more so than in *H. caspius*. Additionally, the habitus of *H. confluens* in general is more globose, in individual specimens, however, this feature may fail.

Discussion: This paragraph deals with the three taxa *H. caspius*, *H. trilineatus*, and *H. confluens* as they have been treated by the different authors. In particular, it is shown that the taxon *H. trilineatus* and those *H. confluens* which have been recorded from China belong to *H. caspius*.

NILSSON (1995: 45, 46) summarised all Chinese records of these taxa:

H. caspius: KAMIYA (1935: 7, 1940: 118): Hebei {**32**}; ZAITZEV (1953: 142, sub *H. reitteri*) and LAFER (1989: 237, sub *H. reitteri*): Gansu {**35**}.

H. trilineatus: FENG (1936: 6), GSCHWENDTNER (1939: 32), and ZAITZEV (1953: 144): Shaanxi {**34**}; ZENG (1989: 3): Xinjiang {**38**}, Gansu {**35**}, Nei Mongol {**33**}, Shaanxi {**34**}.

H. confluens: KAMIYA (1940: 118): "Manchuria" {ca. **32**}; LAFER (1989: 237): NE China {ca. **32**}.

The study of all these references show for the three taxa under consideration:

H. caspius:

KAMIYA (1935: 7) does not reveal undoubtedly if he has studied specimens of *H. caspius*. Anyway, the habitus and the elytral pattern given by him for *H. caspius* (1940: 118, fig. 10; reproduced with slight changes in Fig. 5 of the present work) is no doubt incorrect. I assume that he has figured a specimen of *H. nigrolineatus*.

The origin of ZAITZEV's (1953: 142) record of *H. caspius* (sub *H. reitteri*) from Gansu is unclear. I assume that he has studied material collected by Potanin (see the notes under *H. semenowi*). LAFER (1989: 237) reproduced Zaitzev's record without having studied material himself.

H. trilineatus:

FENG's (1936: 6) description, in particular the figures showing the elytral pattern (Fig. 8) and the male and the female genitalia (Figs. 118, 122) no doubt show that *Coelambus trilineatus* must be *H. caspius*. In Figs. 127, 131

the gonocoxae and the gonocoxosterna in FENG (1936) are reproduced (with slight changes). These fit those of *H. caspius* (Figs. 125, 132), but definitely not those of *H. confluens* (Figs. 128, 132). In my opinion FENG (1936) has not had any knowledge of the descriptions of *H. caspius* and *H. reitteri*.

ZENG (1989: 3) gave records from Xinjiang, Gansu, and Nei Mongol, which - to my knowledge - had not been published before his work. This is why he must have studied specimens from these provinces. I suppose that he has examined some *H. caspius*, and misidentified these by using FENG's (1936) figures for determination. All other authors after FENG (1936) have seen neither the types of *H. trilineatus* nor any other material of this taxon, they all simply reproduced the data and descriptions of the foregoing authors.

H. confluens:

The habitus and the elytral pattern given for *H. confluens* by KAMIYA (1940: 118, fig. 11; reproduced with slight changes in Fig. 6 of the present work) seem also to be incorrect, most probably representing *H. caspius*. The habitus of *H. confluens* is broader than that of *H. caspius*, and if *H. confluens* has the elytral pattern as strongly reduced as in Kamiya's figure the third black line is rarely connected with the fourth in its posterior part. In addition, it should be noted that Kamiya's figure of "*H. confluens*" fits perfectly the figure of *H. trilineatus* in FENG (1936: 6, fig. 11; reproduced in Fig. 8 of the present work).

LAFER's source (1989: 237) for Chinese *H. confluens* is a simple reproduction of KAMIYA's (1940: 118) record.

KAMIYA (1940: 119) recorded *H. enneagrammus* from "Manchuria". According to NILSSON (1995: 46), however, the author has misidentified *H. flaviventris* as *H. enneagrammus*. NILSSON (1995) took his arguments from distributional data in ZAITZEV (1953: 143) (pers. communication by A.N. Nilsson). I agree with Nilsson, because this supports my opinion that KAMIYA (1940: 118) has also misidentified *H. confluens*.

According to ZAITZEV (1953: 141) the most eastern localities for *H. confluens* are Uzbekistan and Kashmir. My own studies confirm Zaitzev's observations more or less (see above at *H. confluens*), in any case this species is a more western Palearctic one which does not exist in northeastern China.

Distribution: Since *H. caspius*, *H. trilineatus*, as well as *H. confluens* sensu KAMIYA (1940: 118) represent the same species, we have the following distribution for eastern Palearctic *H. caspius* (compare Fig. 178): China: Xinjiang, Gansu, Qinghai, Nei Mongol, Shaanxi, "Manchoukuo"; Mongolia, Russia ("Transbaikalia"). The Chinese localities belong to the Northern and Northeastern China zoogeographical regions (see JÄCH & JI 1995b: 10), and these are perfectly completed by the Mongolian and Transbaikalian records. The western populations are found in Russia (West Siberia, South European Territory), Turkmenistan, and Kazakhstan.

M. Ohara (Sapporo, Japan) kindly communicated that he was informed by Y. Morimoto (Kyushu, Japan) that Kamiya's collection burnt during World War II in Tokyo and must be seen as lost. This is why Kamiya's questionable records of *H. caspius* and *H. flaviventris* (see below) no longer can be confirmed.

Hygrotus (*Coelambus*) *pallidulus* (AUBÉ, 1850)

Hydroporus pallidulus AUBÉ 1850: 300. - SHARP 1882: 407.
Coelambus pallidulus (AUBÉ); ZIMMERMANN 1930: 109. - FERY 1995: 1055.
Hygrotus pallidulus (AUBÉ); NILSSON 2001: 208.
Hydrocoptus albidus MOTSCHULSKY 1853: 6. (nomen nudum)

Material studied: **Turkmenistan**: 1 ex., "Turkmenia, Kizyl Arvat [ca. 38.59N 56.16E], 20. - 26.6.1992, Snížek leg." (NMW) (first record for Turkmenistan).

For the nomen nudum *Hydrocoptus albidus* the reader is referred to ZAITZEV (1915: 250), and FERY (1995: 1055).

For detailed descriptions of *H. pallidulus* see e.g. ZIMMERMANN (1930: 109) and ZAITZEV (1972: 149). The male and female genitalia are illustrated in Figs. 120, 124, 129, 133.

Distribution: Turkmenistan, and other countries in Asia, Europe, and North Africa.

Hygrotus (*Coelambus*) *flaviventris* (MOTSCHULSKY, 1860)

Hydroporus flaviventris MOTSCHULSKY 1860a: 303. - SHARP 1882: 407.
Coelambus flaviventris (MOTSCHULSKY); ZIMMERMANN 1930: 109. - ZAITZEV 1953: 142.
Hygrotus flaviventris (MOTSCHULSKY); NILSSON 1995: 46, 2001: 206.
Hydrocoptus flaviventris MOTSCHULSKY 1853: 6. (nomen nudum)
? *Hygrotus enneagrammus* (AHRENS); KAMIYA 1940: 119. (misidentification?)
? *Hydroporus desertorum* BECKER 1861: 308. (nomen nudum)

Type locality: Kazakhstan, "Desert des Kirguises [= region in Kazakhstan]" (in MOTSCHULSKY (1853: 3, 5) is additionally given "E." = "Lacs Elton [ca. 49.06N 46.39E] et Bogdo [ca. 47.58N 46.48E]").

Type material: **Lectotype** (present designation): ♂, "Des. Kirg." [hw Motschulsky], "Hydrocoptus flaviventris Motsch, Des. Kirg." [hw Motschulsky], "1065." [red], "Lectotype, Hydrocoptus flaviventris Motschulsky, 1860, des. H. Fery 2002" [red] (ZMUM).

The name *Hydroporus desertorum* BECKER, 1861 has been treated as a synonym of *H. flaviventris* by ZAITZEV (1928: 11).

Material studied: **China**: QINGHAI: 1 ♂, 1 ♀, "China-Qinghai, Nan Shan, Caka Nun [*], 3300-4200 m, 9.-13.VII.1994, B. Zvaric. Coll. Hendrich" (CHF, further specimens in CLH). As already mentioned under *H. caspius*, KAMIYA (1940: 119) - who recorded *H. enneagrammus* from "Manchuria" - most probably has misidentified *H. flaviventris* as this species. **Kyrgyzstan**: 1 ♂, "Talas-Thal [= Talas Valley], Semirjetschensk, B. Kricheldorff, coll. P. Brinck" (MZL). 1 ♂, same label data, but with additional label: "Hygrotus flaviventris Motsch., det AN Nilsson-03" (CAN) (first record for Kyrgyzstan). **Pakistan**: 1 ♂, "Y.N.I.E., Pool nr [?] Thoqmorv [?] tso. [?] Shushal [most probably = Chushal, ca. 34.41N 73.30E]", "F. Guignot det., 1953, Coelambus flaviventris Motsch." (MZL) (first record for Pakistan). **Turkmenistan**: 3 ♂♂, 7 ♀♀, "fl. [= river] Ters-Akkan [= Tersakan, river in Turkmenistan, ca. 60 km S Kisyl-Arwat]" [red, hw Motschulsky?], "Hydroporus flaviventris mihi, Camp. [= campus = region] Kirg [= region in Kazakhstan]" [hw Motschulsky], "1064." [red]. All specimens glued on a single transparent card, eight of these are almost totally damaged by Dermestidae. The specimens are not treated as belonging to the type series, because neither MOTSCHULSKY (1853: 6) nor MOTSCHULSKY (1860a: 303) provide any information about the locality given above (ZMUM). 1 ♂, "Repetek, Turkest., Lang", "Coll. Gschwendtner", "flaviventris Mots, det. Gschwendtner" (OLML). 1 ♀, "Bucharia, Repetek [ca. 38.35N 63.11E]", "Coelambus tauricus Mtsch", "Coelambus flaviventris Motsch, det. G. Wewalka 1991"; specimen mounted on a glue card; below this specimen a *H. enneagrammus* on a separate card, but on the same pin (NMW). 3 exs., "Ashkhabad" [Cyrillic], "Zoological Institute RAN. St. Petersburg, Russia", coll. Olsufiew (ZISP) 1 ♀, "17.6.1992 Turkmenia, Seydi, 200 m, ca. 39.24N 62.53E, M. Danilevsky leg." (CPM) (first record for Turkmenistan).

For detailed descriptions of *H. flaviventris* see e.g. ZIMMERMANN (1930: 109) and ZAITZEV (1972: 150). The male and female genitalia are illustrated in Figs. 136, 139, 142, 145.

Distribution: China: Xinjiang, Qinghai; Mongolia, Pakistan, Kashmir, Kazakhstan, Russia (West Siberia, South European Territory), and some European countries.

Hygrotus (*Coelambus*) *enneagrammus* (AHRENS, 1833)

Hydroporus enneagrammus AHRENS 1833: 645. - SHARP 1882: 406.
Coelambus enneagrammus (AHRENS); ZIMMERMANN 1930: 109. - ZAITZEV 1908c: 417, 1953: 143.
Hygrotus enneagrammus (AHRENS); GANGLBAUER 1892: 452. - NILSSON 1995: 46, 2001: 206.
Hydroporus tauricus MOTSCHULSKY 1860a: 303.
Coelambus puncticeps SEIDLITZ 1887: 43.

Type material: *Hydroporus enneagrammus*: The type specimens must be regarded as lost (see remarks under *H. parallellogrammus*). **Type locality**: Staßfurt, near Halle, Germany.

Coelambus puncticeps: **Holotype**: "Collection v. Seidlitz", "nigrolineatus, germania" [hw Bonnaire?], "puncticeps, n.sp." [hw Seidlitz], "Type von Coelambus enneagr. var., puncticeps Seidl" [red, hw Zimmermann] (ZSM). Specimen very teneral and damaged, thus not dissected. **Type locality**: "Germany".

Hydroporus tauricus: After having studied a specimen with the number "1053" ("Tauria. - type") in Motschulsky's collection and comparing it with the original description of *H. tauricus*, ZAITZEV (1915: 249) stated: "Although the specimen is labelled 'type', this is hardly the specimen which Motschulsky examined for his description, since its

characters are clearly different: Très voisin du *flaviventris*; même taille [smaller!], mêmes couleurs, mais lignes noires des élytres plus avancées [on the contrary, shorter!], quatrième contigue [with a gap!], suturale la plus courte ... It is more likely that the auctor's description is that of *enneagrammus*, and that the real type of *tauricus* Motsch. is lost". (English text originally in Russian, being Zaitzev's comments to the original description of *H. tauricus*, which is in French (slightly modified by ZAITZEV 1915: 249); translation of the Russian text by P. Petrov). **Type locality**: "La Tauride" [= Taurida = Crimea], Ukraine.

Additional material studied: **Mongolia**: 1 ♂, "Mongolia: Uvs aimak, am Fluss Baruunturuun gol, neben Somon Baruunturuun [ca. 49.39N 94.23E], 1280 m, Exp. Dr. Z. Kaszab, 1968", "Nr. 1012, 25.VI.1968.", "Coelambus enneagrammus Ahr., det. V. Guéorguiev 1970" (HNHM). **Pakistan**: 1 ♂, "Y.N.I.E., Pio Son Sakesar [most probably = Sakesar, ca. 32.15N 72.45E or 32.32N 71.56E], Kahar, on submerged Turq [= turf?], 13 March 1932.", "F. Guignot det., 1953, Coelambus enneagrammus Ahr." (MZL). **Afghanistan**: 5 exs., "Afghanistan, Kuschke, Coll. Hauser 1896" (DEI). 1 ♀, "Afghanistan, Kuschke, Coll. Hauser 1896", "coll. Dr. J. Fodor", "Coelambus tauricus Mtsch." (CHF, further specimens in HNHM) 1 ♂, "Bala Murghab [= Bala Morghab, ca. 200 km NE Herat, 35.33N 63.20E], 1.6. - 10.6.1964, 470m (23)", "N. Afghanistan, Prov. Herat, coll. O. Jakeš" (MMB). 1 ♂, same label data, but "30.6 - 2.7.1964, 470m (37)" (MMB). 1 ♀, "Muričak [= Murichaq, ca. 200 km NE Herat, 35.48N 63.09E], 16.6.1964, 400 m (28)", "N. Afghanistan, Prov. Herat, coll. O. Jakeš" (MMB) (first record for Afghanistan). **Tajikistan**: 1 ♂, "SW Tadzikistan, Shartuz [ca. 37.15N 68.08E] 15.6.1989, I Kovár leg." (CJH) (first record for Tajikistan). **Uzbekistan**: 3 exs., "Buchara", "Coelambus enneagrammus Ahr." (DEI). 1 ♀, "Coll. R.I.Sc.N.B., U.R.S.S. Boukara, Uzbekistan, Coll. R. Mouchamps" (IRSN). 1 ♂, male sex symbol, "Samarkand, ... [rest illegible]", "Sammlung v. Seidlitz" (ZSM). 2 ♀♀, "Uzbekistan, 25 km S Bukhara, 18.V.[19]95, Melnik lgt." (CFP). 11 exs., "Uzbekistan, 30 km S Bukhara, 20-V-[19]97, Melnik" (CFP). 1 ex., "Uzbekistan, Kyzyl-kum, 25 km S Bukhara, 30-V-[19]91" (CFP). 1 ♂, 4 ♀♀, "10.5.1995 Uzbekistan, 25 km S Bukhara, Kisil-kum desert" (CMT). 10 exs., "Uzbekistan, 25 km S Bukhara, 17.V.[19]95" (CHF). 7 exs., "Uzbekistan, 25 km S Bukhara, 20.V.[19]95" (CHF). 6 exs., "Uzbekistan, Buchara, Kogon [= Kagan ca. 12 km SE Bukhara], 15 km Ekocentr. Dzejran [a natural reserve], 23.5.1992, Snizek leg." (CHF, further specimens in CLH) (first record for Uzbekistan). **Turkmenistan**: 18 exs., "Ashkhabad" [Cyrillic], "Zoological Institute RAN, St. Petersburg, Russia", coll. Olsufiew (ZISP). 1 ♂, 1 ♀, "Achabad", "Ahnger" (ZMH). 26 exs., "Turkmenistan, 60 km N Ashchabad, 24-IX-[19]90, Melnik lgt." (CFP). 5 exs., "30.4.1990 Turkmenistan, Kara-kum desert, 60 km N Achshabad" (CJS). 1 ♀, "SNS-Turkmenistan, 1991, 40 km NW of Aschabad, Geok Tepe, 17.5., Z. Kejval lgt." (CJH). 1 ♂, 1 ♀, "Turkmenistan, 50 km N of Ashkhabad, 58°33'E 38°22'N, 100 m, 3.VIII.1992, No. L67, leg. M. Hreblay, Gy. László and G. Ronkay" (CHF, further specimens in HNHM). 2 exs., "USSR, Turkmenia, Kara-Kum desert, 200 m, 20 km SW of Repetek, 63°09'E 38°25'N, 9.V.1991, No. L17, leg. G. Csorba, Gy. Fabian, B. Herczig, M. Hreblay and G. Ronkay" (CHF, further specimens in HNHM). 1 ♀, "Transcasp., Merw [= Mary, ca. 37.35N 61.50E] 4.1900, Coll. Hauser", "Coll. Gschwendtner", "enneagrammus Ahr., det. Gschwendtner" (OLML). 1 ♀, "Transcasp., Merw 5. 1900, Coll. Hauser" [hw Wewalka], "Coelambus enneagrammus Ahr., det. Wewalka 1975" (CBSU). 1 ♂, "Transcasp., Merw 4.1900, Coll. Hauser", "coll. Dr. J. Fodor" (CHF, further specimens in HNHM). 8 exs., "Turkmenistan, Mary, Badchys Nat. - Geb. [= nature reserve], 19. - 20.4.1993, Dostal & Cate leg." (NMW). 1 ♀, "Transcasp., Merw.", "3/97", "Coll. Lindberg" (ZMH). 1 ♀, "Transcasp., Dortkuju [W Mary, ca. 37.38N 61.18E] 4.1900, Coll. H. Hauser.", "C. tauricus" (ZMH). 3 exs., "Turkmenistan, 60 km NE Mary, Sachmet env., ad lucem, 22.4.1995, Dolin leg." (NMW). 30 exs., "17.6.1992 Turkmenia, Seydi, 200 m, ca. 39.24N 62.53E, M. Danilevsky leg." (CPM). 9 exs., "16.6.1992 Turkmenia, Chardzhou, 200 m, ca. 39N 63.30E, M. Danilevsky leg." (CPM). 11 exs., "19.05.1996, Turkmenistan, Karakum-Wüste, Regenpfütze, Umg. Sachmet, Dolin leg. (N19)" (CHF). 6 exs., "Turkmenia bor., Dargan Ata env. [ca. 40.51N 61.57E], 5.6.1992, Lgt. Snížek" (CHF, further specimens in CLH). 1 ex., "Turk, SW Kerki [ca. 37.49N 65.12E], Seit env., salt lake, 24.4.1995, Dolin leg." (NMW). 1 ♂, "Bucharia, Repetek [ca. 38.35N 63.11E]", "Coelambus tauricus Mtsch", "Coelambus flaviventris Motsch, det. G. Wewalka 1991"; specimen mounted on a glue card below a *H. flaviventris* on a separate card, but on the same pin (NMW) 2 ♂♂, "Repetek, at light, south-eastern Kara Kum Desert, Krivokhatsky 11.7.1982" [Cyrillic] (ZISP). 2 ♀♀, "Turkmenia, 14.4.1993, Repetek, Snižek lgt." (CJS). 1 ♀, "USSR, Turkmenia, Kopet-Dagh Mts., 1000 m, Kurkulab, 6 km W Germob, 57°50'E, 38°04'N, 03.10.1991, No. L34, leg. A. Podlussány, L. Ronkay & Z. Varga" (HNHM) (first record for Turkmenistan). **Iraq**: 7 ♂♂, 3 ♀♀, "Iraq, Rawa-Al Hadr, 6.5.1981, R. Linnavuori" (ZMH) (first record for Iraq). AL-HOUTY & ANGUS (1999: 184) recorded "*Hygrotus* sp. near *enneagrammus* (AHRENS)" from Kuwait, after I had informed them to have found distinct differences in the gonocoxae of their female specimens compared with those from other regions. In the meantime, however, I have arrived at the opinion that the deviation in the shape of the gonocoxae is within the normal range of variability of this species. Thus their record must be regarded as a first record for Kuwait of *H. enneagrammus*.

For detailed descriptions of *H. enneagrammus* see e.g. ZIMMERMANN (1930: 109) and ZAITZEV (1972: 150). The male and female genitalia are illustrated in Figs. 134, 137, 140, 143.

ZIMMERMANN (1930: 107, 110) stated that females of *H. enneagrammus* have a black abdomen, being in contrast with *H. pectoralis*, in which the females have a yellow abdomen. ZAITZEV (1953: 143), however, stated that females of *H. enneagrammus* occasionally have at least parts of the abdomen yellow, an observation which I can confirm. Thus the coloration of the venter is not a feature which allows a correct distinction of the females of the two species.

ZIMMERMANN (1930: 110) and ZAITZEV (1953: 143) stated that the females of *H. enneagrammus* have the dorsal surface microreticulate and thus matt. According to my studies, however, the females are dimorphic, the shiny form being more abundant in the southern and eastern parts of the area of distribution.

Distribution: China: Xinjiang (?); Mongolia, Pakistan, Tajikistan, Uzbekistan, Kazakhstan, Turkmenistan, and other countries in Asia, and Europe. The single record from China has been given by ZAITZEV (1908c: 417): "Kara Koschum (Lob-noor)" (= Lopnor = Lop nur = Karakoschum-kul, ca. 40N 90.30E, in Xinjiang). In ZAITZEV (1953: 143), however, this record is not repeated. I have not been able to study the material, but suspect that Zaitzev's specimens might prove to be *H. flaviventris*. Thus to date the occurrence of *H. enneagrammus* in China remains unconfirmed.

Hygrotus (*Coelambus*) *pectoralis* (MOTSCHULSKY, 1860)

Hydroporus pectoralis MOTSCHULSKY 1860a: 303. - SHARP 1882: 805.
Coelambus pectoralis (MOTSCHULSKY); ZIMMERMANN 1930: 110. - ZAITZEV 1953: 143. - FERY 1995: 1052.
Hygrotus pectoralis (MOTSCHULSKY); NILSSON 2001: 208.
Hydrocoptus pectoralis MOTSCHULSKY 1853: 6. (nomen nudum)

Type locality: Presnogorkovsk [*], Kazakhstan.

Type material: **Lectotype** (♂) designated by FERY (1995: 1052), stored in the ZMUM; label data: "Salzsee [= saline lake] bei [= near] Presnogorkovsk", "Hydroporus pectoralis mihi, Sibiria occidt." [hw Motschulsky], "Coelambus pectoralis" [hw?], "Lectotypus, Hydroporus pectoralis Motsch., des. Fery 1995" [red]. **Paralectotypes**: 1 ♂, 1 ♀, lecto- and paralectotypes originally glued onto the same card, separated by me, and each pin provided with copies of the original labels and red paralectotype labels (ZMUM).

Recently I have studied another specimen of the Motschulsky collection: 1 ♂, "Sib. or." [hw Motschulsky], "Hydrocoptus pectoralis Motsch, Sib. or." [hw Motschulsky], "1063." [red] (ZMUM). MOTSCHULSKY (1853: 3, 6) recorded the species from "So." (= "Siberie orientale"), and "M." (= "Mongolie"); in MOTSCHULSKY (1860a: 304), however, only "Sibérie occidentale" was provided. Therefore, this specimen it is not treated as further paralectotype herein.

Additional material studied: **Russia**: 1 ♀, "nigrolineatus Stev., Russ. mer.", "Hist. - Coll., 10097", "Zool. Mus. Berlin" (MNB). 1 ♀, "Celjabinsk", "Tscheljabinsk [ca. 55.12N 61.22E], Westsibirien, Ural", "Coll. Gschwendtner", "Coelambus pectoralis Mot., det. Gschwendt." (OLML). 8 exs., "Sibirien, Baikal, Hügelsteppe ca. 15 km S Jelantsy [*]", "eutropher Tümpel in sumpf. Wiese an Kiefernwaldrand, 26.VI.1993", "leg. Krause & Jäger, Staatl. Museum für Tierkunde Dresden" (SMTD). 32 exs., "Sibirien, Baikal, Hügelsteppe ca. 15 km S Jelantsy", "24.VI.1993, See, leicht salzig", "leg. Krause & Jäger, Staatl. Museum für Tierkunde Dresden" (SMTD). **Kazakhstan**: 1 ♂, "Songorie [*] Ebn... [illegible]", "Hist. - Coll., 10097", "Zool. Mus. Berlin" (MNB). 1 ♂, "Stalinskiy distr., Akmolinsk (Astana) region, Kazakhstan, 13.VII.1947" (ZMUM).

For detailed descriptions see e.g. ZIMMERMANN (1930: 110), ZAITZEV (1972: 150), and FERY (1995: 1052). The male and female genitalia are illustrated in Figs. 135, 138, 141, 144.

Distribution: The species has been recorded from Kazakhstan (locus typicus: Presnogorkovsk [*]), and the "steppes of the southeast of the European USSR, Western Siberia, and Turkmenia" (after ZAITZEV 1972: 150; see also FERY 1995: 1052). According to the material studied the distributional area extends, however, to the Baikal region in East Siberia.

Appendix (explanations for geographical names and German label texts)

Chinese localities

Caka Nun: most probably = Caka Nur = Caka Yanhu (Yanhu = salt lake), ca. 36.42N 99.06E (Qinghai).
Cheng Chin: most probably = Chenqingqiao, ca. 49.08N 127.14E (Heilongjiang).
Djalantun = Tschalantun = Zalantun, ca. 48.00N 122.44E (Nei Mongol).
Greater Kingom Mountain = Greater Khingan Range = Da Hinggan Ling (Nei Mongol, Heilongjiang).
Humboldt Range = Danghe Nanshan, ca. 36N 96E, west of Har Hu (Hu = lake) (Qinghai).
Kansu-tsing-hai = Kuku-nor = Qinghai Hu, ca. 37N 100E (Qinghai).
Kuldscha = Ili = Gulja = Yining, ca. 43.53N 81.16E (Xinjiang).
Lesser Khingan = Xiao Hinggan Ling (Khingan = Chingan = Hinggan); mountain range in N Heilongjiang.
Nan Shan: according to ZHAO & ADLER (1993) Nan-Shan is a mountain range at the border of Gansu and Qinghai provinces.
Richthofen Geb. = Qilian Shan (N Qinghai Hu) (Geb. = mountain range) (Gansu, Qinghai).
Satschshou (oasis): Situated in the northwestern part of Gansu province, ca. 150 km WSW Anxi; given in "Stichlers Handatlas" as "Sa-tschou". Today it is named "Shazaoyuan" (39.58N 94.20E, "The Times Atlas of the World").
Tenkar = Huangyuan, ca. 36.40N 101.15E (Qinghai).
Ulan Bulak: According to "Stichlers Handatlas" situated in Qinghai province (ca. 39N 95E), and not in Xinjiang province (= Sinkiang), but not far from the border to this province.
Weishaho: most probably = Weishahe, ca. 42.52N 127.13E (Jilin).

Mongolian localities

aimak = aymag = province
Arbajcher = Arvayheer, ca. 46.15N 102.46E (Övörhangay aymag).
Bajandelger = Bayandelger, ca. 47.44N 108.07E (Töv aymag).
Bajanterem = Bayanterem, ca. 47.08N 112.23E (Sühbaatar aymag).
Bajon-obo = Bayan Ovoo, ca. 47.47N 112.07E (Hentiy aymag).
Bogd = Bodi, ca. 45.05N 100.52E (Bayanhonger aymag).
Chadatin-bulan: ca. 60 km N Bayanterem, ca. 47.46N 112.26E (Sühbaatar aymag).
Chalcha = Khalkha; a historical name for a region north of Gobi desert; see "Stichlers Handatlas".
Chalchingol = Halhin gol (gol = river), ca. 47.55N 117.47E; maybe also = Halhol, ca. 47.55N 118.05E (Choybalsan aymag = Dornod aymag).
Changai: "Changai" is situated in northwestern Mongolia (centre ca. 500 km W Ullaanbaatar); according to LEDER (1895: 111) the name "Changai" means "mountainous land".
Char us nuur: lake Char us, ca. 48.00N 92.10E (Hovd aymag).
Dsapchyn river: most probably = Dzavhan gol, near Zargalan (see at this name) (Govi-Altay aymag).
Dschargalante: I must offer several explanations for this name because I have not been able to find a final solution: (1) It may be a misspelling of "Dschirgalantui"; according to LEDER (1894b: 418) "Dschirgalantui" can be translated as "valley of happiness", and is a widespread name in Mongolia. (2) From LEDER's (1894b: 415 ff.) description of his Mongolian expedition can be taken that a small river with this name exists, which is situated ca. at 47.10N 104.20E (pers. communication by H. Schütze). (3) The locality may be identical with Dschargalantö (ca. 46.30N 105E) in "Stichlers Handatlas". (4) According to a map in KOZLOW (1925: 64) a locality Dschirgalanty exists ca. 100 km SSW of Ulaanbaatar; this locality should be identical with "Jirgalanta" in "Microsoft Encarta World Atlas, 2000" (ca. 47.09N 106.40E). I suppose that this is the most probable of the possibilities discussed (Töv aymag).
Kerulen = Kerulen river = Herlen gol (gol = river).
Lun = Lün, ca. 47.52N 105.15E (Töv aymag).
Nojon nuruu = Noyon mountain range, ca. 43.15N 101.55E (Ömnögovi aymag).
Norovlin = Uldz, ca. 48.40N 111.59E (Hentiy aymag).
Ogij nur = Ögiy nuur = lake Ögiy, ca. 47.46N 102.46E (Arhangay aymag).
Öndörchaan = Öndörhaan, ca. 47.19N 110.39E (Hentiy aymag).
Örög nuur = lake Örög = lake Üüre, ca. 50.10N 91.00E (Uvs aymag).
Somon = "district" or "district centre".
Uvs nuur = lake Uvs, ca. 50.03N 92.21E (Uvs aymag).
Zargalan: most probably = Jargalant, ca. 45.41N 97.10E (Govi-Altay aymag).
Zinst = Jinst, ca. 45.25N 100.30E, ca. 40 km NNW Bogd (= Bodi) (Bayanhonger aymag).

Kazakh localities

Akche-tau = Akchatau = Aqshatau, ca. 47.59N 73.45E.

Barsuki = Bolshiye Barsuki sands, reaching from Shalqar to the Aral Sea, Chernyshev Bay, ca. 46.00-47.30N 58.30-59.30E (pers. communication by P. Petrov).

Chelkar = Shalqar, ca. 47.48N 59.39E.

Dshulek = Zhulek, ca. 44.17N 66.25E.

Indersk = Inder, ca. 48.39N 51.47E.

Kok-dshida: Means most probably "Kokzhide" in the Emba River valley, between Temir river mouth and Kozhasay village, 6 to 10 km SW from Emba village (ca. 48.15-48.30N 57.05-57.25E) (pers. communication by P. Petrov).

Presnogorkovsk = Prjesnogorkowsk = Presnogorkovskoi = Presnogorkovka, ca. 500 km WSW Omsk, 54.29N 65.46E.

Songorie = Songarie, region between Lake Balkhash and China.

Tschatyrly: Most probably a misspelling of the name "Tschagyrly", which should denote the Chagyrly-kumdy river in Temir district. Today this river is called Shagyrlykumdy, it flows into the Uil river about 70 km W Temir village (ca. 49.10N 56.10E) (pers. comm. by P. Petrov).

Russian localities

Jelantsy = Jelanzy = Yelantsy, ca. 52.47N 106.22E, ca. 200 km NE Irkutsk.

"Sibirien, Reitter. Leder.": "Sibirien" = "Siberia"; this label text relates to the region around Irkutsk; see LEDER (1894a).

Ust Aldan = mouth of river Aldan, ca. 63.25N 129.53E.

Ust Vilui = mouth of river Vilui; Vilui = Vilyuy = Wiljuj, ca. 64.15N 126.25E.

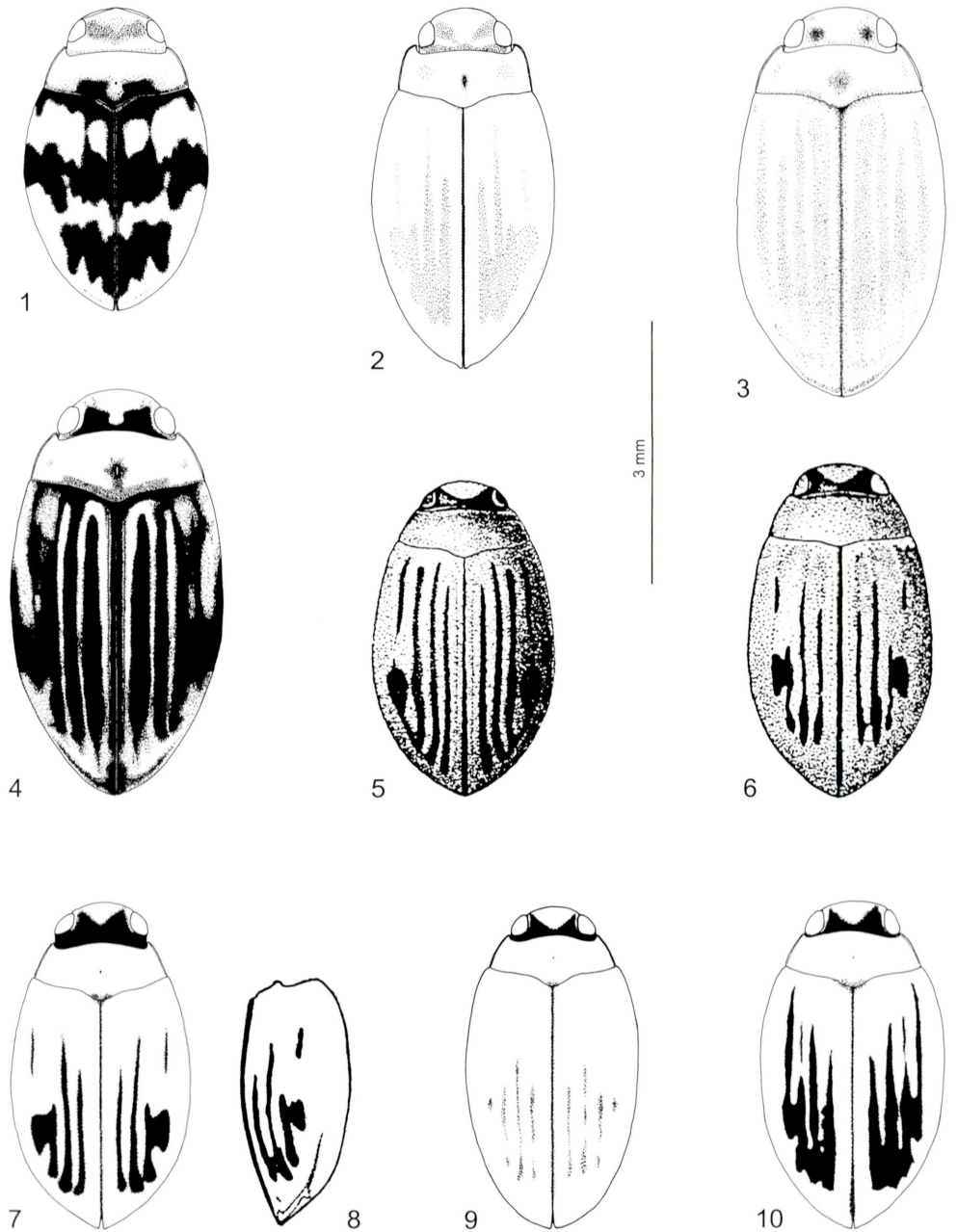
Uzbek localities

Chiwa = Hewa = Khiva, oasis, ca. 41.22N 60.21E.

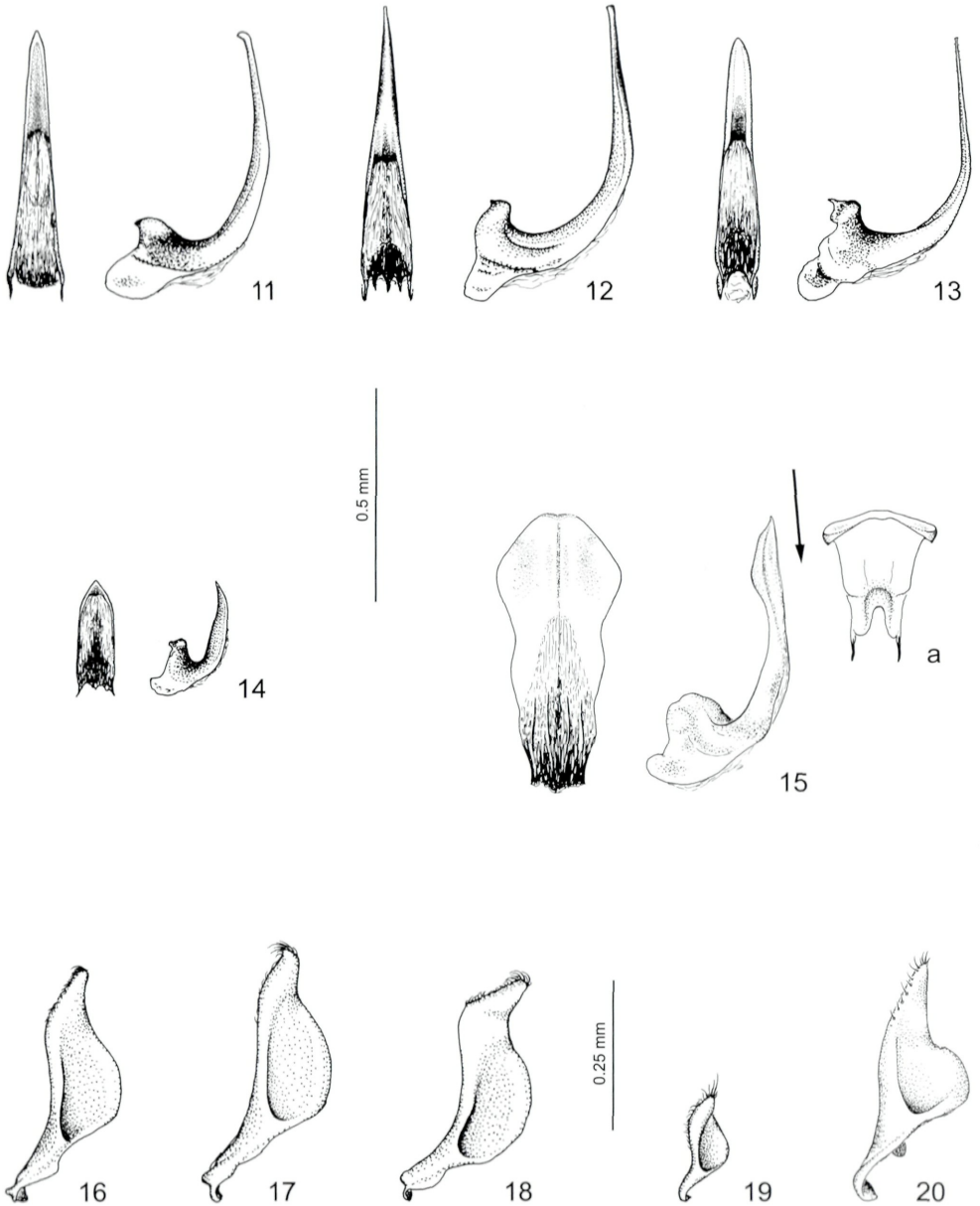
Chairowot = Showot (?), ca. 41.39N 60.17E.

German label notations

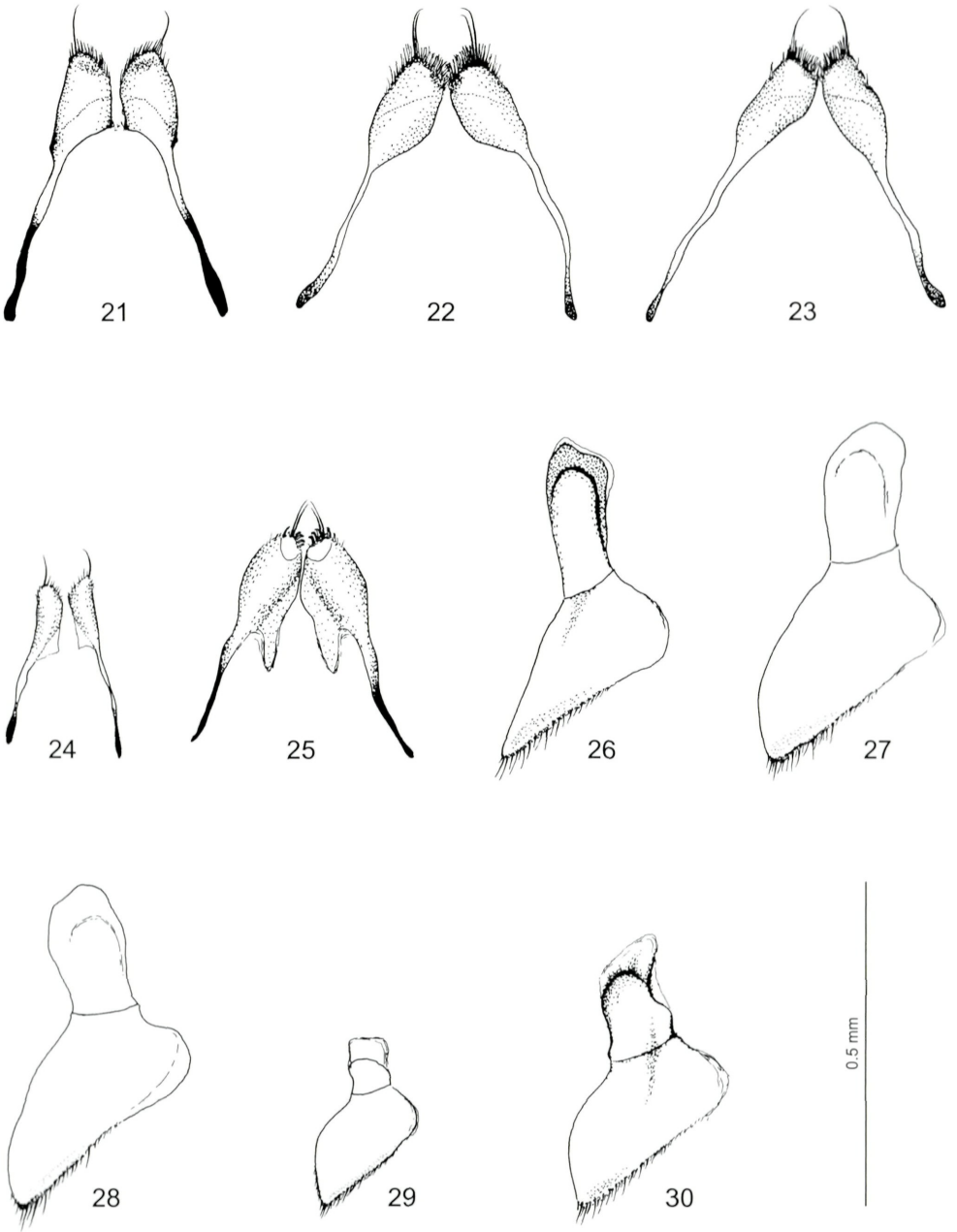
"Bergsee-Ufer" = "edge of a mountain lake"
"Bez." = "Bezirk" = "district".
"Geb." = "Gebirge" = "mountain range".
"Hügelsteppe" = "hilly steppe".
"leicht salzig" = "slightly saline".
"Kiefernwaldrand" = "pinewood border".
"Lagunen" = "lagoons".
"NO Ecke des Sees" = "northeastern corner of the lake".
"Nordl. [= Nördl.] Mongolei" = "northern Mongolia".
"O von der Stadt" = "east of the town".
"Regenpfütze" = "rain puddle".
"S Rand des Sees" = "southern margin of the lake".
"S von" = "south of".
"Schlammflächen" = "areas with muddy soil".
"SO-Ufer des Sees" = "southeastern edge of the lake".
"Süd-Schensi" = "southern Shensi" (Shensi = Shaanxi).
"sumpf. Wiese" = "marshy meadow".
"SW Ecke des Sees" = "southwestern corner of the lake".
"SW Rand des Sees" = "southwestern margin of the lake".
"Tümpel" = "pond, puddle".
"Ufer des" = "bank of [river]".
"Umg." = "environs".
"Wüste" = "desert".



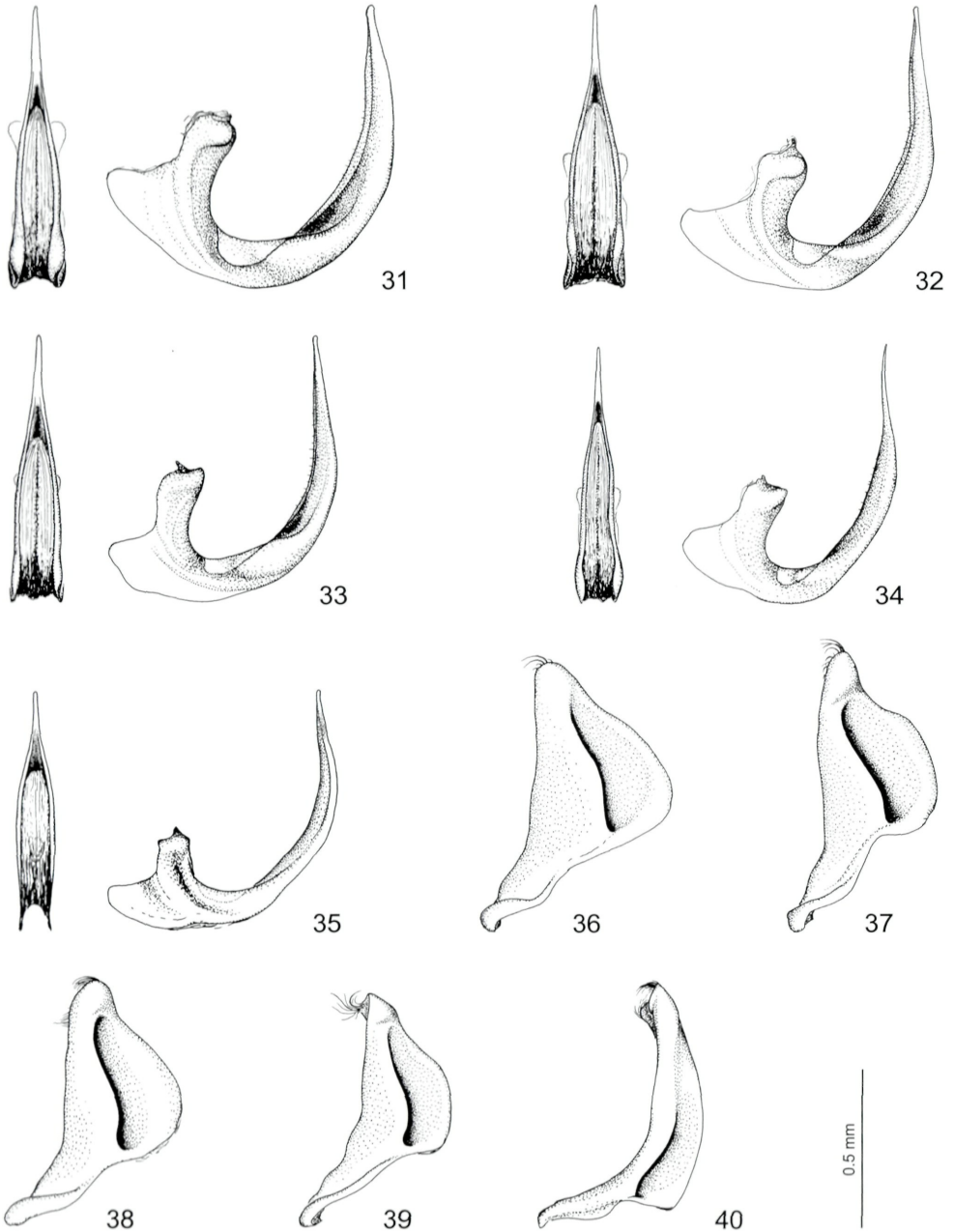
Figs. 1 - 7: Habitus of 1) *Hygrotus aequalis*, 2) *H. zigetangco* sp.n., 3) *H. chinensis*, specimen from Harbin (China, Heilongjiang), 4) *H. chinensis*, specimen from Japan, 5) "*H. caspius*" sensu KAMIYA (1940: 118; modified), 6) "*H. confluens*" sensu KAMIYA (1940: 118; modified), 7) *H. caspius* (specimen from Mongolia).
Fig. 8: Right elytron of *Hygrotus trilineatus* (after FENG 1936).
Figs. 9 - 10: Habitus of *Hygrotus caspius* 9) lectotype of *H. caspius*, 10) lectotype of *H. reitteri*.



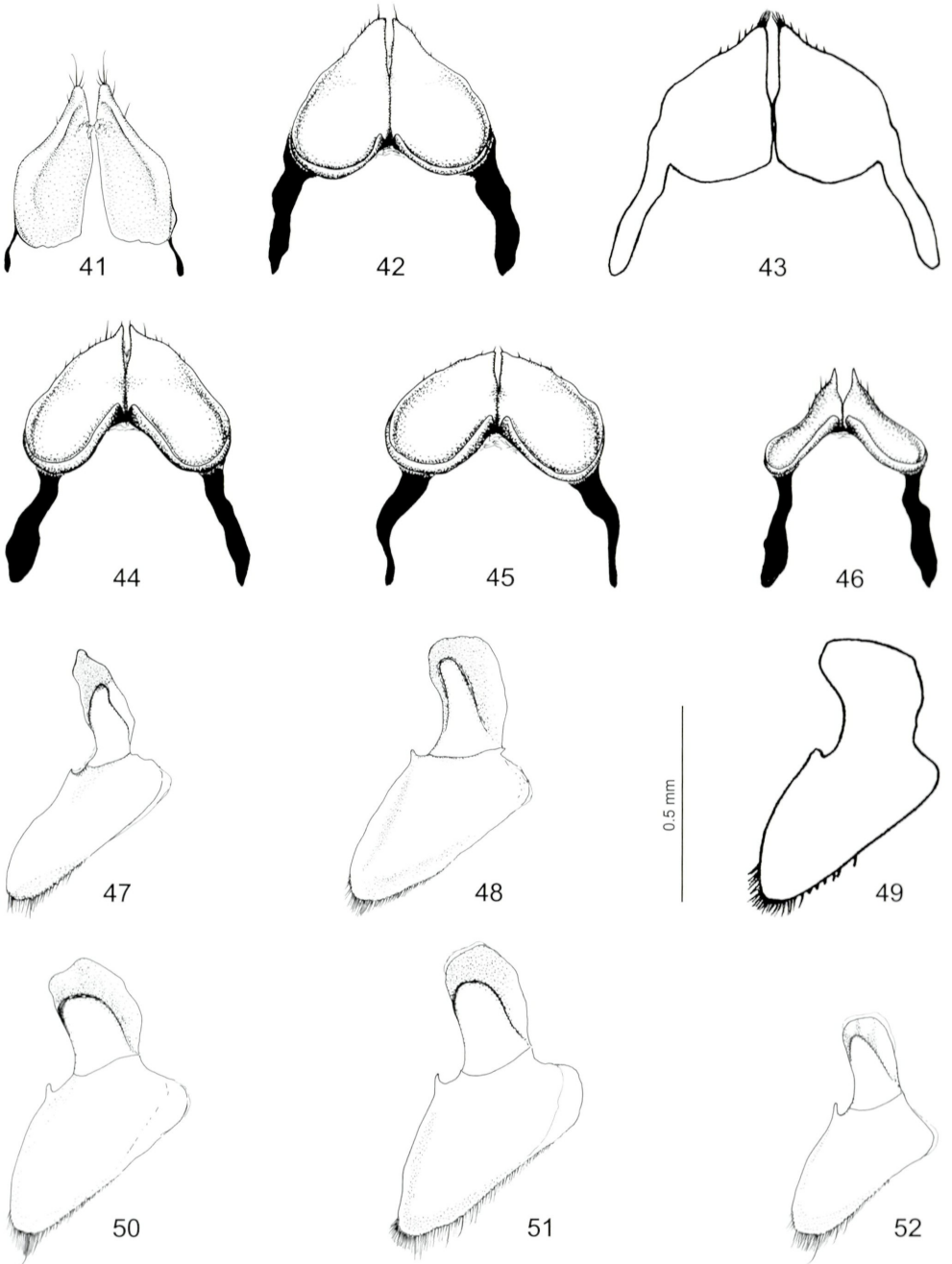
Figs. 11 - 15: Median lobe of aedeagus in dorsal and lateral view of 11) *Hygrotus inaequalis*, 12) *H. quinquelineatus*, 13) *H. versicolor*, 14) *H. decoratus*, 15) *H. aequalis* (frontal view (a) indicated by the arrow).
Figs. 16 - 20: Paramere of 16) *Hygrotus inaequalis*, 17) *H. quinquelineatus*, 18) *H. versicolor*, 19) *H. decoratus*, 20) *H. aequalis*.



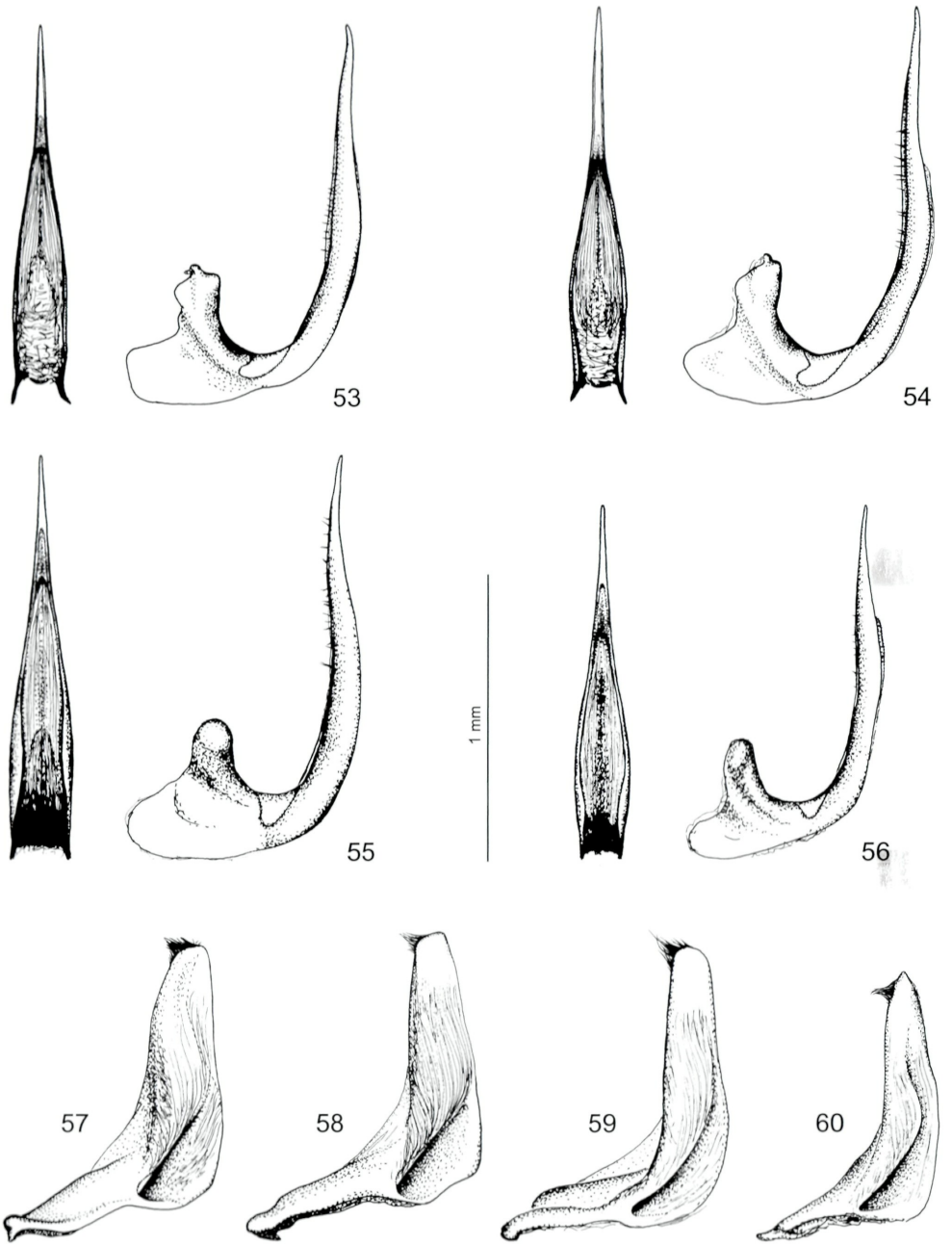
Figs. 21 - 25: Gonocoxae of 21) *Hygrotus inaequalis*, 22) *H. quinquelineatus*, 23) *H. versicolor*, 24) *H. decoratus*, 25) *H. aequalis*.
Figs. 26 - 30: Gonocoxosternum of 26) *Hygrotus inaequalis*, 27) *H. quinquelineatus*, 28) *H. versicolor*, 29) *H. decoratus*, 30) *H. aequalis*.



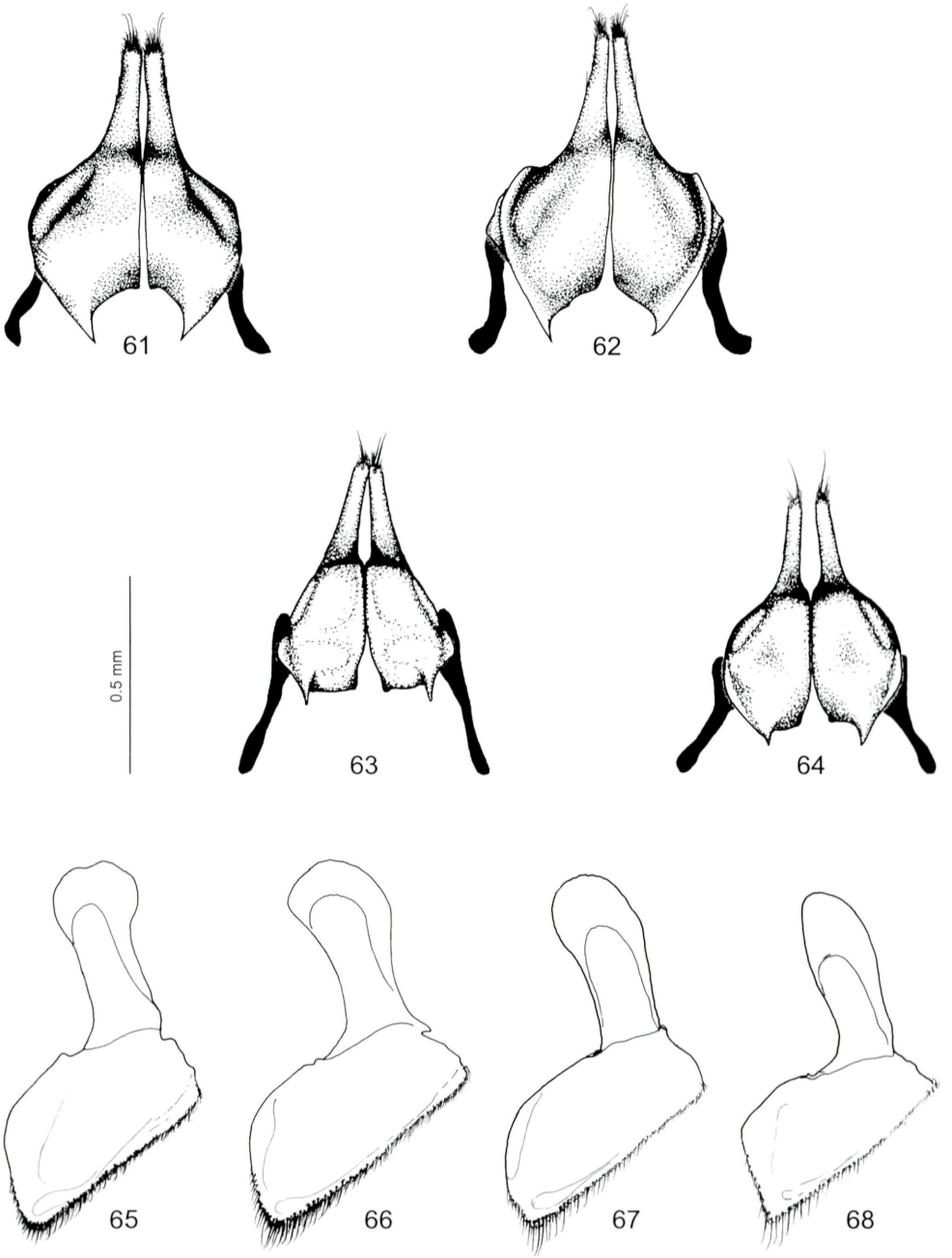
Figs. 31 - 35: Median lobe of aedeagus in dorsal and lateral view of 31) *Hygrotus parallellogrammus*, 32) *H. lagari*, 33) *H. sanfilippoi*, 34) *H. lernaeus*, 35) *H. inscriptus*.
Figs. 36 - 40: Paramere of 36) *Hygrotus parallellogrammus*, 37) *H. lagari*, 38) *H. sanfilippoi*, 39) *H. lernaeus*, 40) *H. inscriptus*.



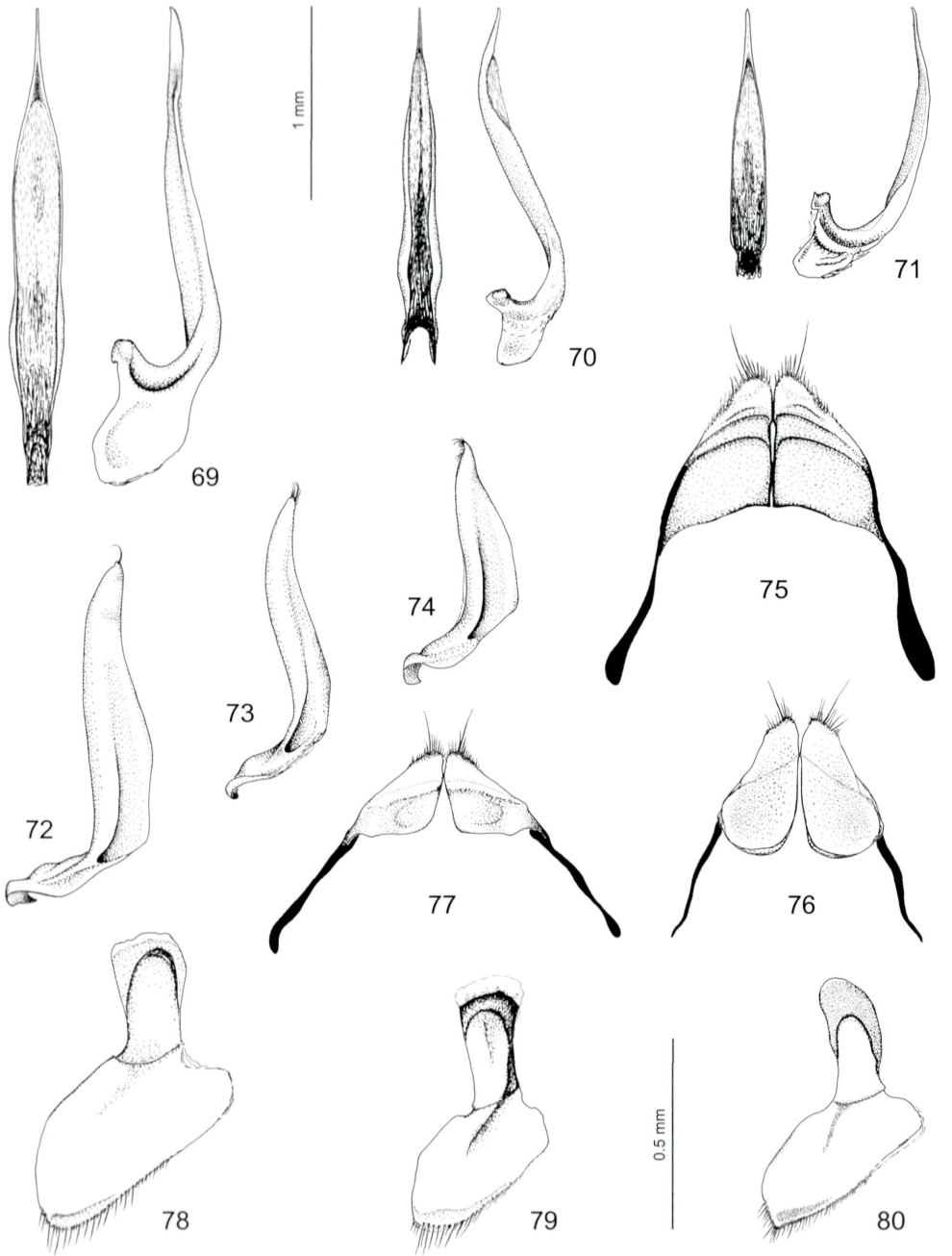
Figs. 41 - 46: Gonocoxae of 41) *Hygrotus inscriptus*, 42) *H. parallellogrammus*, 43) *H. distinctus* (after FENG 1936), 44) *H. lagari*, 45) *H. sanfilippoi*, 46) *H. lernaeus*.
Figs. 47 - 52: Gonocoxosternum of 47) *Hygrotus inscriptus*, 48) *H. parallellogrammus*, 49) *H. distinctus* (after FENG 1936), 50) *H. lagari*, 51) *H. sanfilippoi*, 52) *H. lernaeus*.



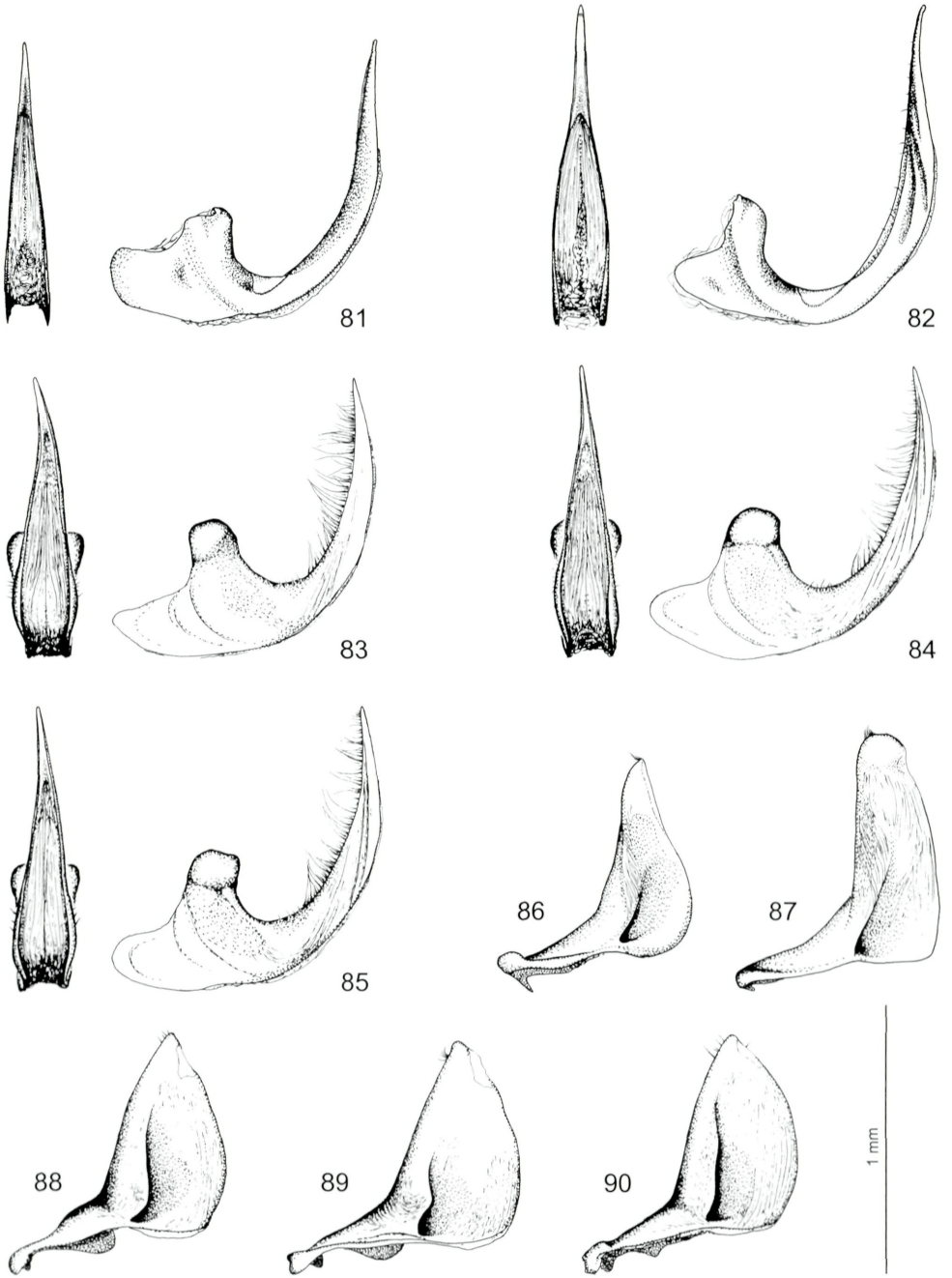
Figs. 53 - 56: Median lobe of aedeagus in dorsal and lateral view of 53) *Hygrotus saginatus*, 54) *H. fresnedai*, 55) *H. armeniacus*, 56) *H. semenowi*.
Figs. 57 - 60: Paramere of 57) *Hygrotus saginatus*, 58) *H. fresnedai*, 59) *H. armeniacus*, 60) *H. semenowi*.



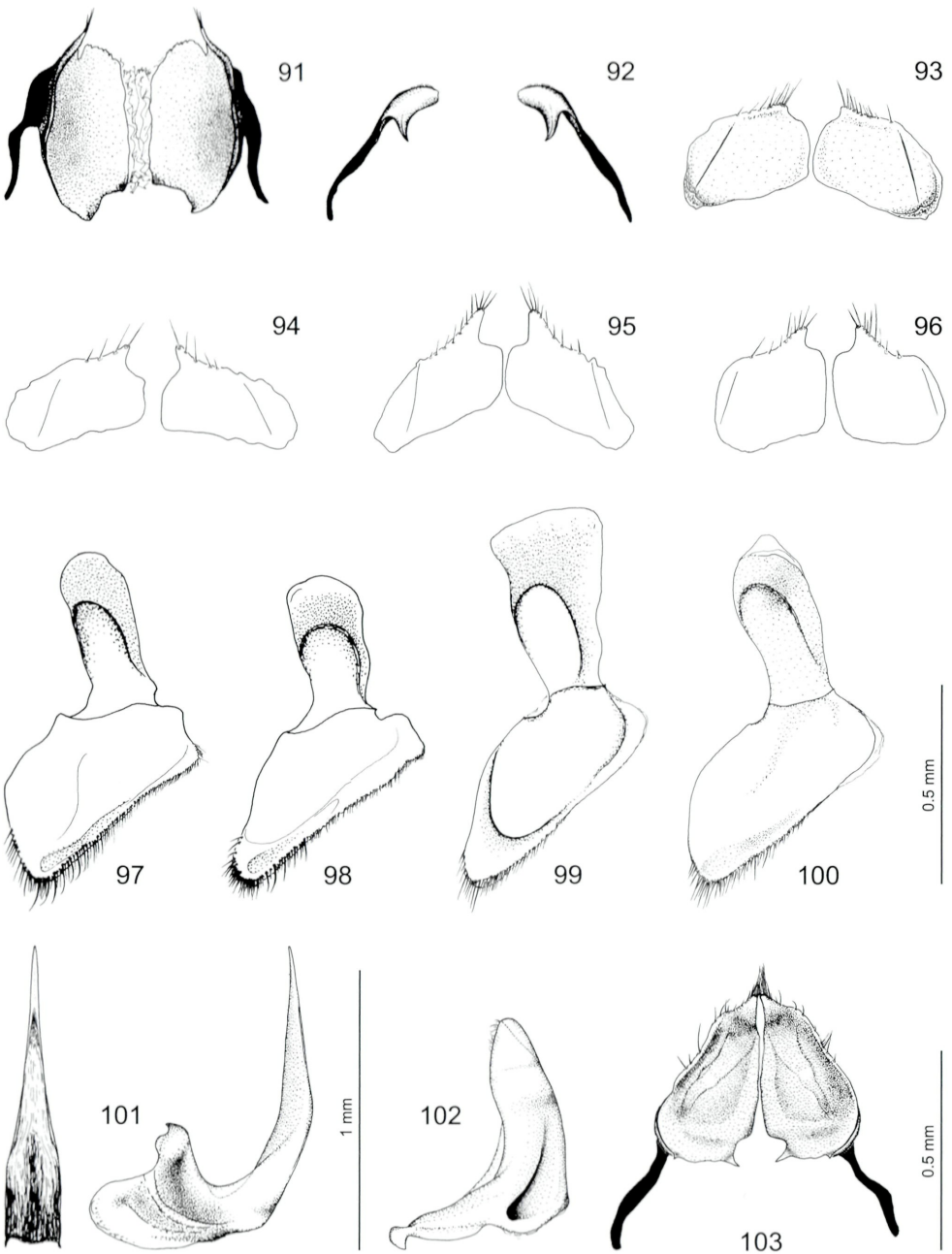
Figs. 61 - 64: Gonocoxae of 61) *Hygrotus saginatus*, 62) *H. fresnedai*, 63) *H. armeniacus*, 64) *H. semenowi*.
Figs. 65 - 68: Gonocoxosternum of 65) *Hygrotus saginatus*, 66) *H. fresnedai*, 67) *H. armeniacus*, 68) *H. semenowi*.



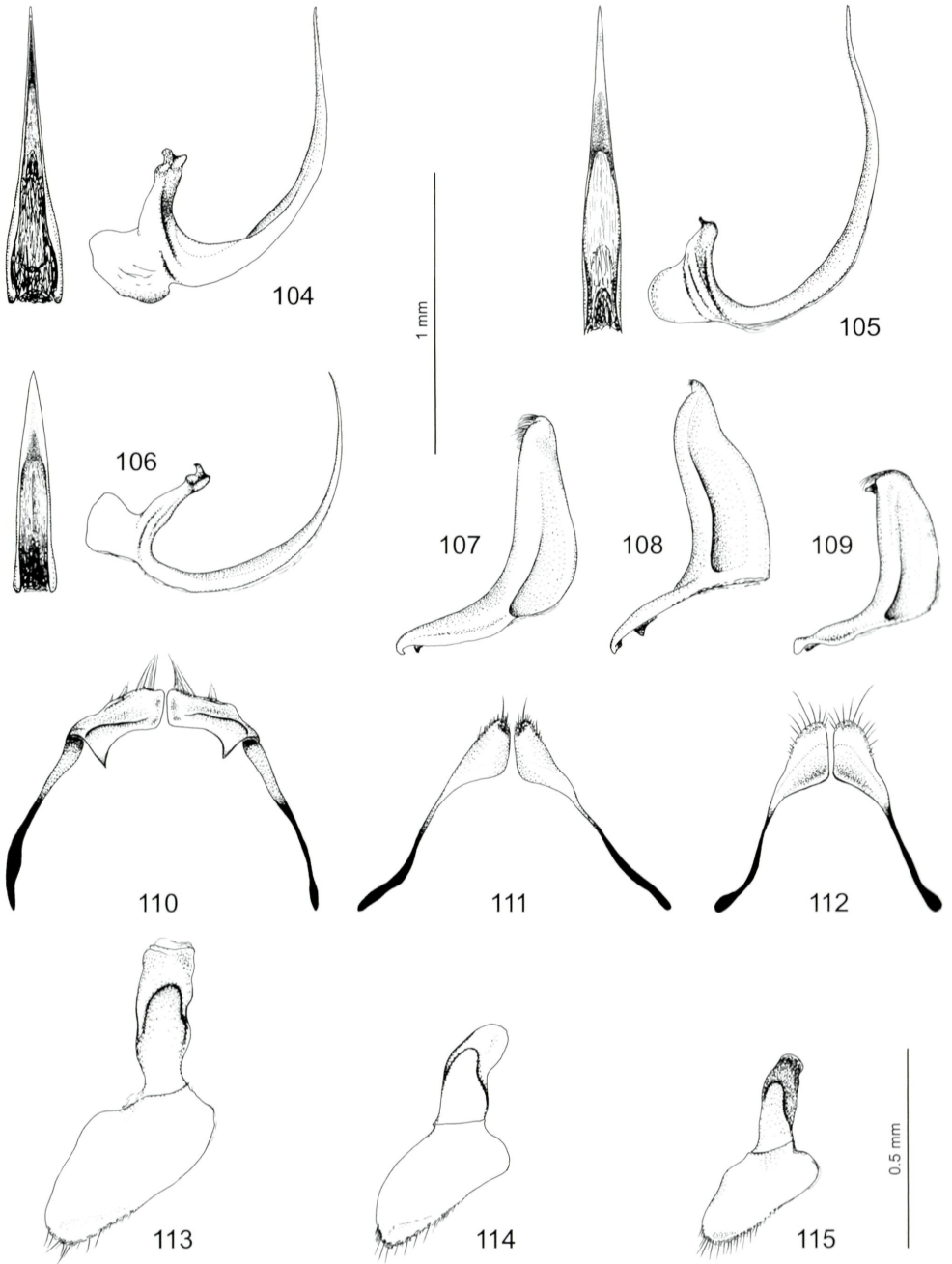
Figs. 69 - 71: Median lobe of aedeagus in dorsal and lateral view of 69) *Hygrotus unguicularis*, 70) *H. zigetangco* sp.n., 71) *H. novemlineatus*. Figs. 72 - 74: Paramere of 72) *Hygrotus unguicularis*, 73) *H. zigetangco* sp.n., 74) *H. novemlineatus*. Figs. 75 - 77: Gonocoxae of 75) *Hygrotus unguicularis*, 76) *H. zigetangco* sp.n., 77) *H. novemlineatus*. Figs. 78 - 80: Gonocoxosternum of 78) *Hygrotus unguicularis*, 79) *H. zigetangco* sp.n., 80) *H. novemlineatus*.



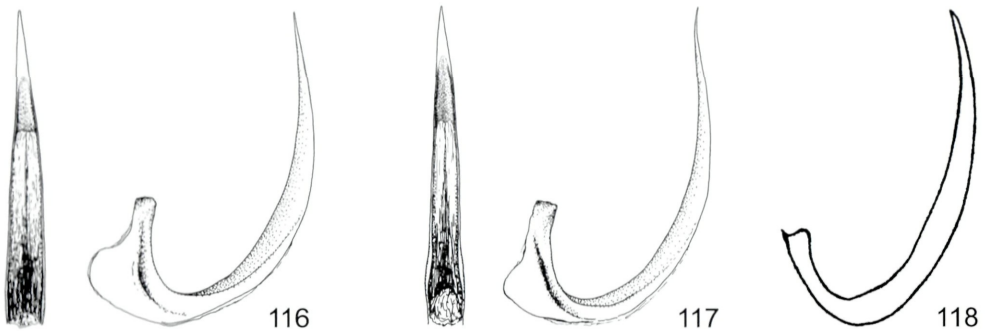
Figs. 81 - 85: Median lobe of aedeagus in dorsal and lateral view of 81) *Hygrotus corpulentus*, 82) *H. urgensis*, 83) *H. chinensis,* lectotype, 84) *H. chinensis*, lectotype of *H. vittatus*, 85) *H. chinensis*, specimen from Harbin (China, Heilongjiang). Figs. 86 - 90: Paramere of 86) *Hygrotus corpulentus*, 87) *H. urgensis*, 88) *H. chinensis*, lectotype, 89) *H. chinensis*, lectotype of *H. vittatus*, 90) *H. chinensis*, specimen from Harbin (China, Heilongjiang).

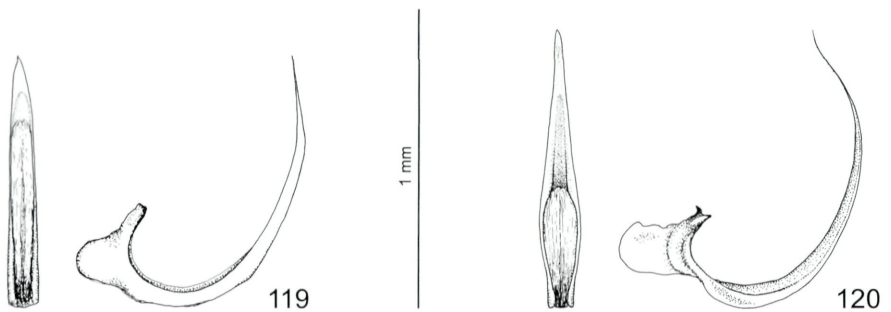


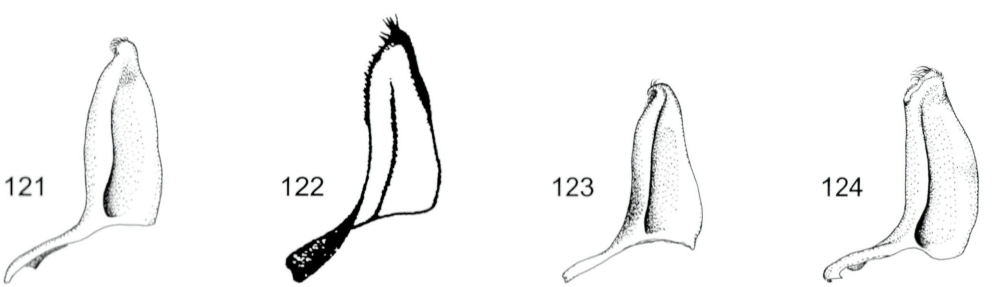
Figs. 91 - 96: Gonocoxae of 91) *Hygrotus urgensis*, 92) *H. corpulentus*, 93) *H. chinensis*, specimen from Japan, 94) *H. chinensis*, specimen from Harbin (China, Heilongjiang), 95) *H. chinensis*, specimen from Primorye (Russia, Far East), 96) *H. chinensis*, specimen from Taiwan (Figs. 94 - 96 schematic).
Figs. 97 - 100: Gonocoxosternum of 97) *Hygrotus urgensis*, 98) *H. corpulentus*, 99) *H. chinensis*, 100) *H. impressopunctatus*.
Figs. 101 - 103: *Hygrotus impressopunctatus*: 101) Median lobe of aedeagus in dorsal and lateral view, 102) paramere (the dotted line indicates the range of variability), 103) gonocoxae.



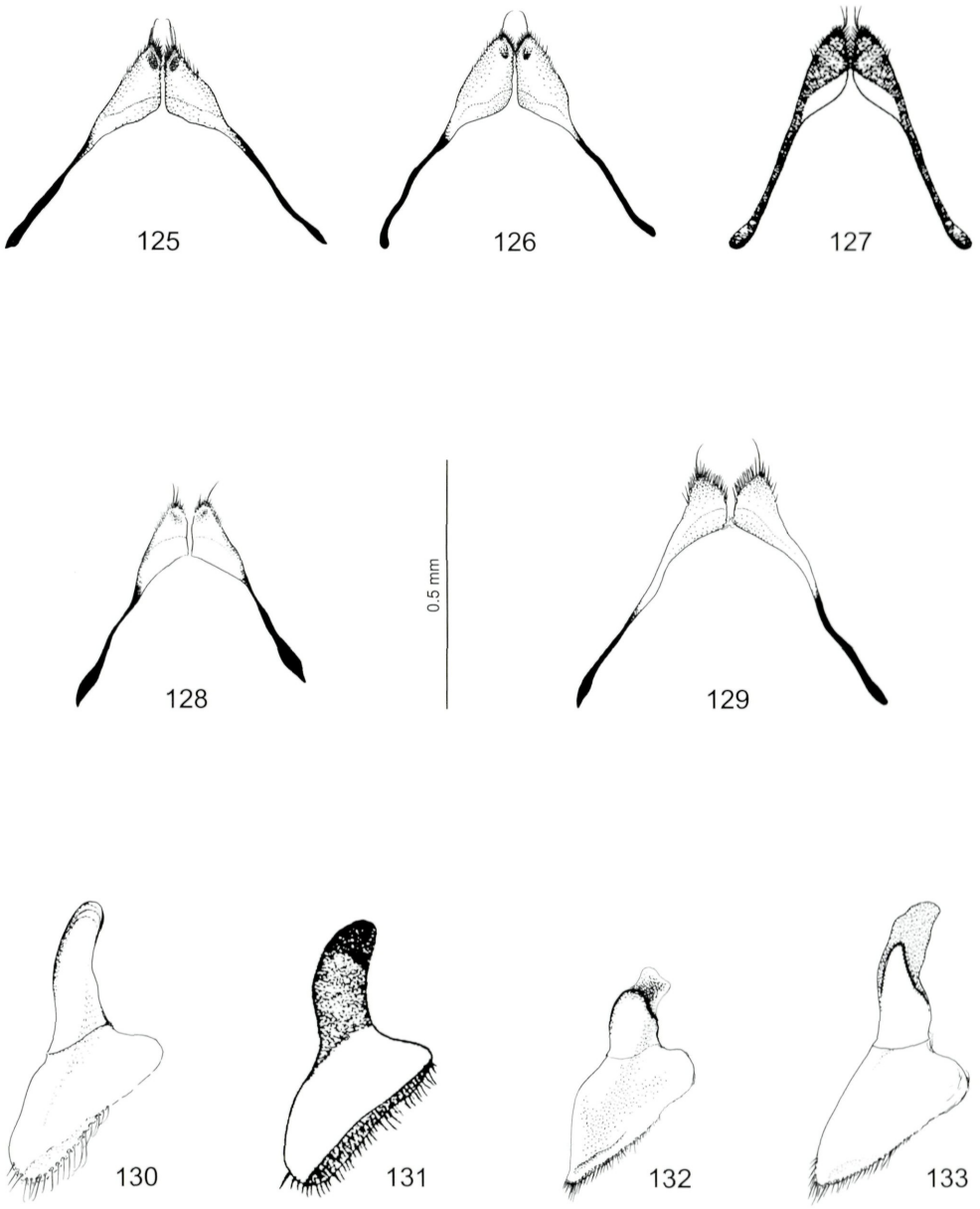
Figs. 104 - 106: Median lobe of aedeagus in dorsal and lateral view of 104) *Hygrotus polonicus*, 105) *H. nigrolineatus*, 106) *H. marklini*.
Figs. 107 - 109: Paramere of 107) *Hygrotus polonicus*, 108) *H. nigrolineatus*, 109) *H. marklini*.
Figs. 110 - 112: Gonocoxae of 110) *Hygrotus polonicus*, 111) *H. nigrolineatus*, 112) *H. marklini*.
Figs. 113 - 115: Gonocoxosternum of 113) *Hygrotus polonicus*, 114) *H. nigrolineatus*, 115) *H. marklini*.



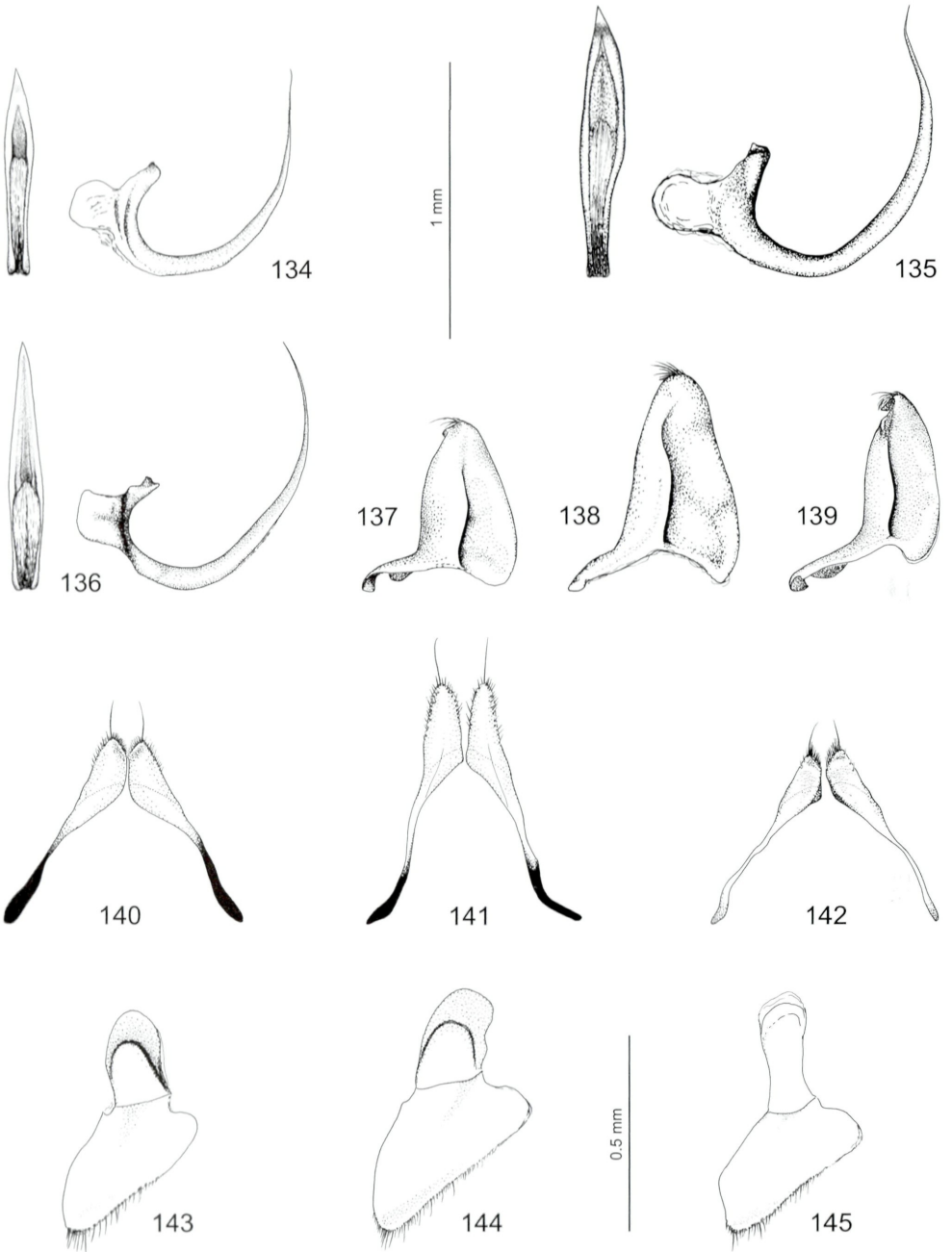




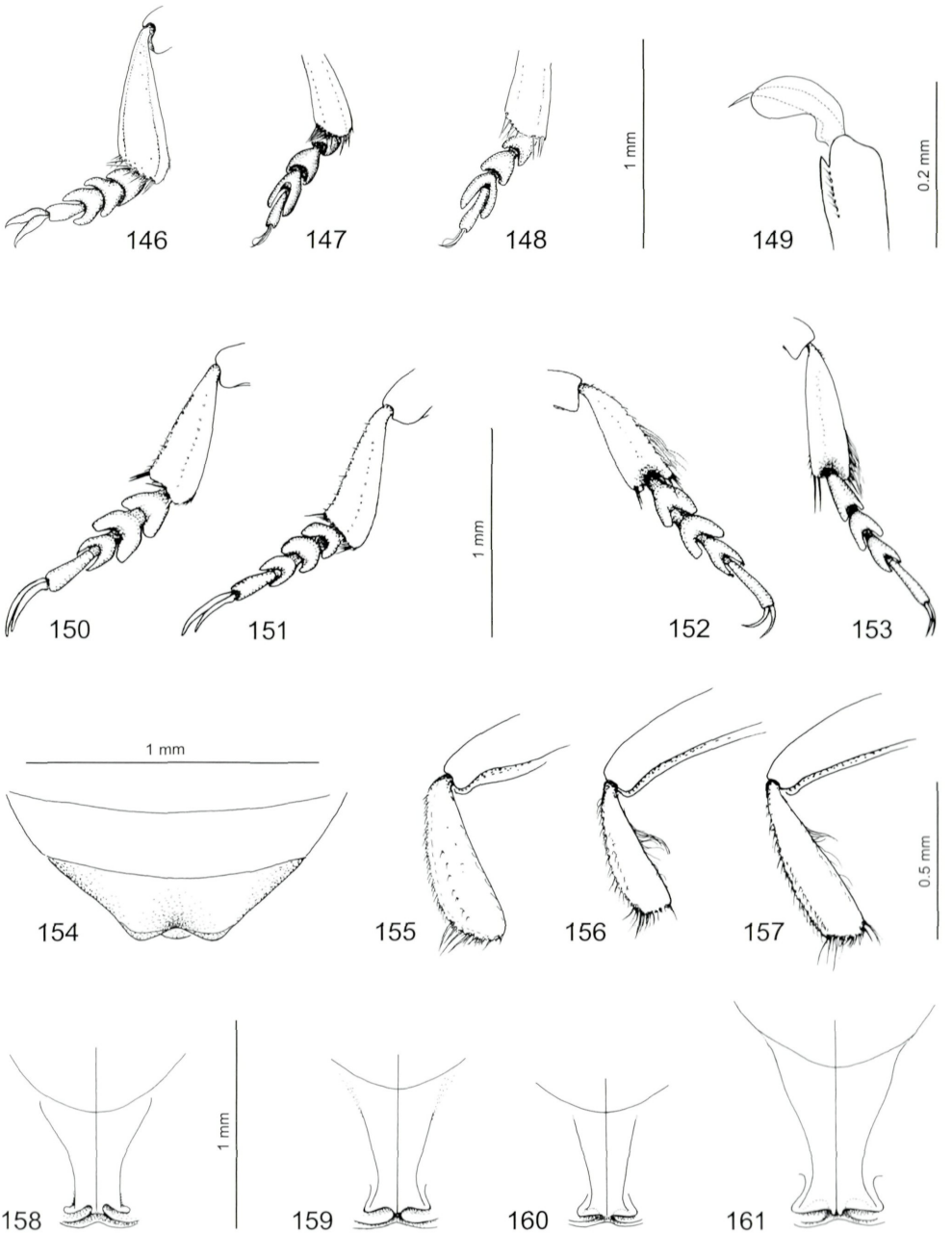
Figs. 116 - 120: Median lobe of aedeagus in dorsal and lateral view of 116) *Hygrotus caspius*, lectotype, 117) *H. caspius*, lectotype of *H. reitteri*, 118) *H. trilineatus* (after FENG 1936), 119) *H. confluens*, 120) *H. pallidulus*.
Figs. 121 - 124: Paramere of 121) *Hygrotus caspius* (lectotype of *H. reitteri*), 122) *H. trilineatus* (after FENG 1936), 123) *H. confluens*, 124) *H. pallidulus*.



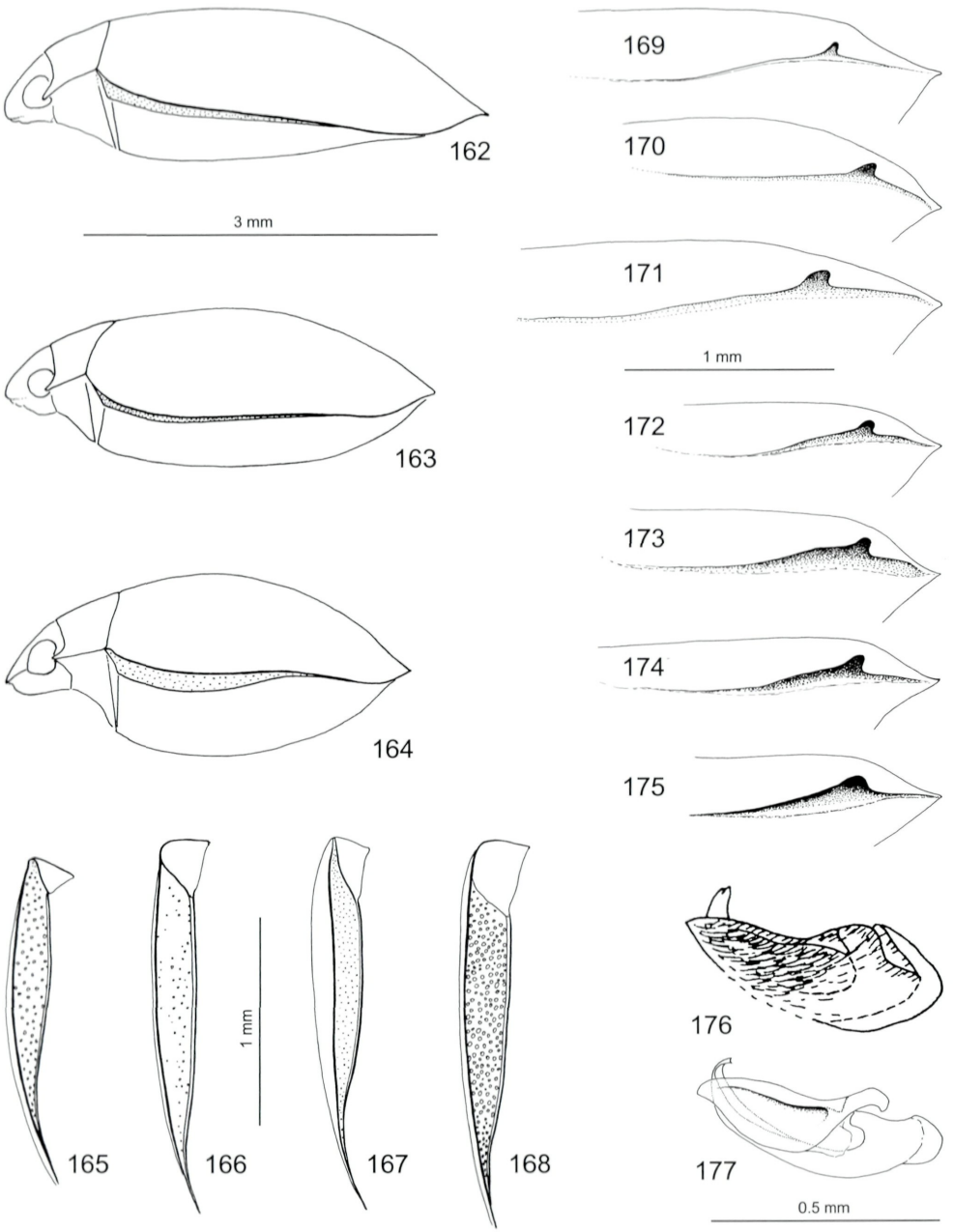
Figs. 125 - 129: Gonocoxae of 125) *Hygrotus caspius*, specimen from Temir (Kazakhstan), 126) *H. caspius*, paratype of *H. reitteri*, 127) *H. trilineatus* (after FENG 1936), 128) *H. confluens*, 129) *H. pallidulus*.
Figs. 130 - 133: Gonocoxosternum of 130) *Hygrotus caspius* 131) *H. trilineatus* (after FENG 1936), 132) *H. confluens*, 133) *H. pallidulus*.



Figs. 134 - 136: Median lobe of aedeagus in dorsal and lateral view of 134) *Hygrotus enneagrammus*, 135) *H. pectoralis*, 136) *H. flaviventris*.
Figs. 137 - 139: Paramere of 137) *Hygrotus enneagrammus*, 138) *H. pectoralis*, 139) *H. flaviventris*.
Figs. 140 - 142: Gonocoxae of 140) *Hygrotus enneagrammus*, 141) *H. pectoralis*, 142) *H. flaviventris*.
Figs. 143 - 145: Gonocoxosternum of 143) *Hygrotus enneagrammus*, 144) *H. pectoralis*, 145) *H. flaviventris*.



Figs. 146 - 148: Right male protarsus of 146) *Hygrotus zigetangco* sp.n., 147) *H. chinensis*, lectotype, 148) *H. chinensis,* lectotype of *H. vittatus*. Fig. 149: Claws of right male protarsus of *Hygrotus chinensis*. Figs. 150 - 151: Right male protarsus of 150) *Hygrotus p. polonicus*, 151) *Hygrotus p. sahlbergi*. Figs. 152 - 153: Right male mesotarsus of 152) *Hygrotus p. polonicus*, 153) *Hygrotus p. sahlbergi*. Fig. 154: Male last visible abdominal segment of *Hygrotus aequalis*. Figs. 155 - 157: Left male mesotibia of 155) *Hygrotus aequalis*, 156) *H. inaequalis*, 157) *H. versicolor*. Figs. 158 - 161: Metacoxal processes of 158) *Hygrotus aequalis*, 159) *H. zigetangco* sp.n., 160) *H. caspius*, 161) *H. chinensis*.



Figs. 162 - 164: Habitus in lateral view of 162) *Hygrotus zigetangco* sp.n., 163) *H. caspius*, 164) *H. aequalis*. Figs. 165 - 168: Right epipleuron of 165) *Hygrotus aequalis*, 166) *H. zigetangco* sp.n., 167) *H. caspius*, 168) *H. polonicus*. Figs. 169 - 175: Inner side of left elytron with ligula of 169) *Hygrotus zigetangco* sp.n., 170) *H. caspius*, 171) *H. chinensis*, 172) *H. aequalis*, 173) *H. inaequalis*, 174) *H. versicolor*, 175) *Herophydrus musicus*. Figs. 176 - 177: Aedeagus in lateral view of 176) *Hygrotus alei* (after ABDUL-KARIM & ALI 1986: 283), 177) *Herophydrus musicus*.

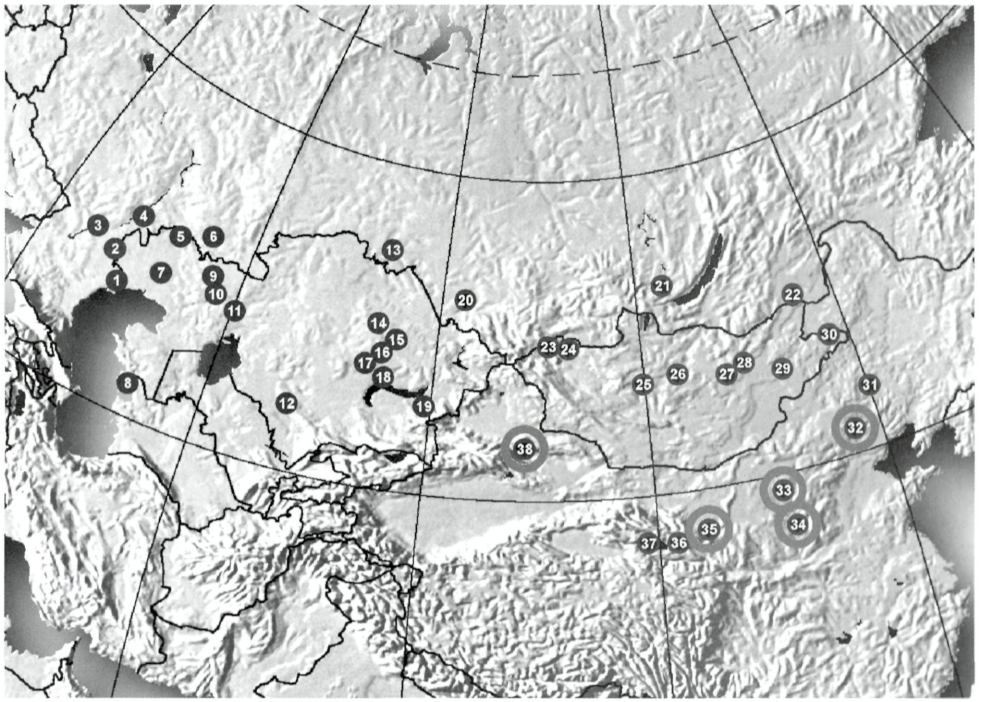


Fig. 178: Distribution of *Hygrotus caspius*. Black dots surrounded by a grey circle refer to records which are impossible to localise precisely, and indicate occurrence in the appropriate province or region (for explanations see the numbers in curly brackets under *H. caspius*).

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Dr. Hans FERY
Räuschstr. 73, D - 13509 Berlin, Germany