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KLAUSNITZER (1991) adds that *H. cuspidatus* occurs in standing water and also in brackish water.

H. cuspidatus is a “red-list” species in the Berlin area of Germany (BALKE & HEDRICH, 1991). It is regarded as a stenotope species (iliophilous and acidophilous) preferring warm and sunny bodies of water. Changes in the quality of the water, e.g. increase in nutrient content, is suggested as a major reason for threats to the species. In northern Germany the species obviously overwinters as larva and imago. In the same region the species was sampled only in woodland fens and mosses among peat-moss (HENDRICH & BALKE, 1991b). (See also under the section Biology, p. 376).

SPANGLER (1962) reports that numerous larvae of *H. pustulatus* together with adults were sampled from a small *Potamogethon* choked farm pond in Missouri, USA.

From Hawaii, WILLIAMS (1936) gives some behavioural and ecological notations on *H. confertus* (determination not controlled), predominantly based on observations of specimens kept in glass jars. Thus the conditions for the specimens are different from those in the field, and accordingly the results must be examined, taking this into consideration.

H. confertus is recorded from weedy lowland swamps, abandoned rice fields, hoof prints of cattle and other small water-bodies. When swimming along the bottom it pauses at intervals. Adults live for many months in laboratory dishes, to which filamentous green algae, debris and occasional food such as dead insects are added. Dissection revealed some food remains: Head-portions of larvae of the fly family Psychodidae, fragments of tiny crustaceans, and bristles of a nereid worm. One egg was found weakly glued to algae in the jar. The newly hatched larva runs lightly over the flocculent bottom or keeps to vegetation – it does not swim. For air it creeps to the surface (cf. also above).

The male of many species is most probably capable of sound-production by use of its stridulation apparatus.

6.2. Special taxonomic cases

Here I have listed different problematic cases as unexamined specific taxa, exclusion of species from *Hydrovatus*, unsolved confusion of names, use of nomen nudum etc.

Unexamined taxa

Hydrovatus austrocaledonicus (Perroud)

Hyphidrus austrocaledonicus PERROUD, 1864:74 (orig. descr.); Sharp, 1882a:816 (descr., disc., faun.).

Hydrovatus austrocaledonicus PERROUD, ZIMMERMANN, 1920a:31 (faun., list.). Deposition of type material unknown.

ZIMMERMANN (1920a) lists the taxon as belonging to *Hydrovatus*. Re-examination of type material is necessary to assure its association with *Hydrovatus*.

The species is known only from New Caledonia.

Hydrovatus fulvescens Motschulsky

Hydrovatus fulvescens MOTSCHULSKY, 1859:43 (orig. descr.); SHARP, 1882a:326 (descr., faun.); BRANDEN, 1885:26 (faun.); RÉGIMBART, 1888:611 (faun.); 1899b:234 (descr., disc., faun.); ZIMMERMANN, 1920a:33 (faun.); 1927:19, 21 (descr., faun.); GSCHWENDTNER, 1933:160 (disc.); VAZIRANI, 1977a:27 (faun.). Type material not located.

Probably close to species placed in species group 6 in this work. *H. fulvescens* has been recorded from India, Burma, Indonesia: Sumatra and Java.

Hydrovatus gracilis Régimbart

Hydrovatus gracilis RÉGIMBART, 1899:234 (orig. descr.); ZIMMERMANN, 1920a:34 (faun.). According to the original the description, holotype kept in coll. Wehncke. Not located.

Probably close to *H. pumilus* Sharp.

Only known from Indonesia: Java.

Hydrovatus japonicus Takizawa

Hydrovatus japonicus TAKIZAWA, 1933:166 (orig. descr.); KAMIYA, 1938:10 (disc.); GSCHWENDTNER, 1939:2 (descr., faun.); NAKANE, 1959:61 (descr.); 1965:14 (faun.); ZAITZEV, 1972:116 (descr., disc., faun.); NAKANE, 1988a:21, 22 (descr., faun.); 1988b:19, 20 (descr., faun.); 1990b:25 (faun.). Holotype in Ent. Mus., Hokkaido Univ., Japan.

Recorded from Japan. According to KAMIYA (1938), synonymous with *H. adachii* Kamiya (= *H. subtilis* Sharp). According to ZAITZEV (1972), closely related to *H. acuminatus* Motschulsky. NAKANE (1988a, 1988b, 1990b) refers to the name as a valid species.

Hydrovatus tardiosus Guignot

Hydrovatus tardiosus GUIGNOT, 1953b:197 (orig. descr.); 1954d:101 (descr., faun.); 1959a:135, 140 (descr., faun.). Holotype in Museum G. Frey, not located.

Recorded from Guinea. Reported by GUIGNOT (1954d) to resemble *H. pauxillus* Gschwendtner (= *H. globulosus* Gschwendtner). Status unclear.

Hydrovatus ischyryus Guignot

Hydrovatus ischyryus GUIGNOT, 1954e:196 (orig. descr.); VAZIRANI, 1977a:28 (faun.). Holotype in Museum G. Frey, not located.

Recorded from Sri Lanka. According to original description, close to *H. castaneus* Motschulsky. Specific status unclear.

Hydrovatus singularis Guignot

Hydrovatus singularis GUIGNOT, 1956e:76 (orig. descr.). Holotype in MNHN, not located.

Described from Madagascar. Belongs to a species with distinctly modified male antenna. Status unclear.

Hydrovatus irakensis Abdul-Karim & Ali

Hydrovatus irakensis ABDUL-KARIM & ALI, 1986:280 (orig. descr.); ALI & ABDUL-KARIM, 1990:10 (descr., faun.).

Type material in Iraq Nat. Hist. Museum, Baghdad, not located. Recorded from Iraq. Specific status unclear.

Hydrovatus meridionalis Abdul-Karim & Ali

Hydrovatus meridionalis ABDUL-KARIM & ALI, 1986:281 (orig. descr.); ALI & ABDUL-KARIM, 1990:10 (descr., faun.).

Type material in Iraq Nat. Hist. Museum, Baghdad, not located. Recorded from Iraq. Specific status unclear.

Species excluded

Hydrovatus pasiricus CSIKI, 1938:126; VAZIRANI, 1977a:28.

H. p. var. *simplicior* CSIKI, 1938:127; VAZIRANI, 1977a:28.

H. p. var. *unicolor* CSIKI, 1938:127; VAZIRANI, 1977a:28.

Holotypes of all three taxa, kept in TMB, have been examined, and their considerable morphological differences (eg. metacoxal process not incised) make the exclusion of *H. pasiricus* and its variations from *Hydrovatus* necessary. Their location in the Dytiscidae is at present somewhat unclear. Possibly to be placed somewhere among the Hyphydrini-Bidessini. According to Dr. Günther Wewalka of Vienna, the species belongs to the genus *Microdytes* (pers. comm.).

Name confusion

Hydrovatus inequalis Illiger, FENG, 1936:2 (descr., faun.; by mistake, *Hydrotatus*). On the basis of Feng's illustrations I believe that without question, not a question of a *Hydrovatus* species (possibly *Hygrotus*).

ABDUL-KARIM & ALI, 1986:281, 282 uses for comparative purposes the name *H. ferrugineus* Régimbart. The same taxon is keyed in ALI & ABDUL-KARIM (1990:10).

As far as I know, no species with this name has ever been introduced. Possibly the authors above refer to *H. ferrugatus* Régimbart, in this work synonymized with *H. subrotundatus* Motschulsky.

Nomen nudum

GUIGNOT (1945a:313) lists *H. perversus* Guignot as an endemic species of savannahs and steppes in eastern Africa.

No species with that name has ever been described.

OMER-COOPER (1967:62) lists the name *H. persimilis* Guignot among species close to *H. fallax* and *H. badius* (= *H. deserticola* Guignot).

In fact, no species with that name has been thus far described.

6.3. Key to species groups of *Hydrovatus*

Unfortunately I have managed to construct only a tentative key to the species groups. The user of this work is therefore also referred to the descriptions of the 15 species groups introduced below. Only male specimens can generally be determined with the keys inserted after the description of the species groups. The user is, at least in the beginning, advised to control determinations by comparison with illustrations of also other species groups. Correct determination requires, in many cases, correctly named specimens for comparison.