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**Autor:** Biström, O.  
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- 11. Small species (length 1.62–3.08 mm). **sp. group 4**
- Larger species (length 3.38 mm). **sp. group 8**
- 12. Apex of penis (dorsal aspect) laterally distinctly expanded (Figs 1095, 1110). **sp. group 12**
- Apex of penis laterally not distinctly expanded . . . . . 13
- 13. Apex of penis broadly truncate (dorsal aspect), often with a distinct constriction near apex (Figs 1233, 1271); general punctuation evenly distributed on elytron (exception: *H. sumatrensis* p. 547); male antenna often modified (Fig. 1251) (Oriental region, China, Japan, Australia). **sp. group 14**
- Apex of penis different (dorsal aspect), sometimes obtuse but never with distinct constriction near apex; general punctuation unevenly distributed on elytron (coarser and denser frontally at suture than laterally and apically); male antenna not modified . . . . . 14
- 14. Big species (length 3.76–5.28 mm); penis (lateral aspect) without distinct strengthening lobes (Fig. 1202); male protarsal claws symmetric to almost symmetric, not distinctly modified (Africa). **sp. group 13**
- Small to large (length 1.92–5.02 mm); large species with penis provided with distinct lateral strengthening lobes (Fig. 975) (exception: *H. gravis* p. 380); large species generally with asymmetric male protarsal claws (Fig. 940). **sp. group 11**

#### 6.4. Key to the species

##### Species group 1 (sp.gr. *pictulus*)

Length of body: 1.80–2.86 mm, breadth: 1.08–1.94 mm. Shape of body globular to slightly elongated. Colouration of dorsal aspect of body varies between unicoloured and distinct dorsal colour pattern.

Head: Frontal outline of male head angular, medially straight, and at least there distinctly margined (Fig. 23). Sometimes margin thickened and in one species male provided with a minute upwards curved process (Figs 30–31). Female head frontally not modified, except in one species medially a little inwardly curved (Fig. 29). Antennae and palpi in both sexes simple.

Ventral side: Stridulatory apparatus absent.

Legs: Claws simple.

Male genitalia: Penis in dorsal view medially broad (Fig. 25). Weakly sclerotized medial part of penis (dorsal view) provided with

backwards-projecting pointed processes (Fig. 39). Apex of penis distinctly bent downwards and provided with hairs (Fig. 34). Apical part of paramere broad, without distinct sclerotized hook (Fig. 27).

Three species are recognized in this subgroup distributed in South and Central America and the Ethiopian region of Africa.

The posteriorly projecting dorsal processes of the penis and the modified frontal part of the male head are probably synapomorphies indicating monophyly of this subgroup.

#### Key to species

1. Elytra with distinct colour pattern (Fig. 21) (Ethiopian region).  
**H. pictulus** Sharp (p. 125)
- Elytra practically unicoloured (America) . . . . . 2
2. Male head frontally without a minute process (Fig. 37); penis medially with curved lateral processes (Fig. 40).  
**H. hintoni** n. sp. (p. 131)
- Male head frontally with a process (Figs 30–31); penis medially without curved lateral processes (Fig. 34).  
**H. crassulus** Sharp (p. 129)

Description of species, see p. 125.

#### Species group 2 (sp. gr. *turbinatus*)

Length of body: 1.82–1.96 mm, breadth: 1.24–1.32 mm. Body fairly globular. Elytra without distinct colour pattern, darker than main colour of head and pronotum.

Head: In both sexes frontally rounded, distinctly margined (Fig. 44). Antennae and palpi in both sexes simple.

Legs: Mesotarsal claws asymmetric, one of claws distinctly prolonged (Fig. 46).

Ventral side: Stridulatory apparatus absent.

Male genitalia: Penis quite broad. Weakly sclerotized medial part without processes. Apex of penis straight (Fig. 48), in dorsal view apex rounded and nude (Fig. 47). Apical part of paramere quite broad, without a well sclerotized hook, but with a peculiar modification (Fig. 49).

A monobasic group, only known from South America.

Details in anatomy of male genitalia, mentioned above, and asymmetry of mesotarsal claws in male are unique characters for *H. turbinatus* Zimm. Probably they represent apomorphous structures.

For description of species, see p. 133.

### Species group 3 (sp.gr. *pustulatus*)

Length of body: 1.92–3.76 mm, breadth: 1.22–2.72 mm. Shape of body varies between somewhat elongated and globular. Unicoloured species to those with distinct colour pattern are represented in this group.

Head: Frontal outline rounded to angled, margined (Figs 64, 112). Sometimes frontal margin indistinct or absent close to eyes and for a short distance medially (Fig. 119). Antennae and palpi in both sexes simple, except one species, the male of which is provided with enlarged antennal segments (Fig. 126).

Elytra: Two species with a distinct lateral furrow on each elytron (Fig. 141). A unique structure in *Hydrovatus*.

Ventral side: Without stridulatory apparatus.

Legs: In both sexes generally simple or almost simple. Male of one species provided with distinctly thickened protarsal claws (Fig. 114).

Male genitalia: Groundplan of penis and paramere similar throughout the subgroup. Apex of penis always long, narrow, and tip curved downwards (Fig. 67). Paramere lacks apical hook, almost evenly sclerotized, and apex often provided with a small membranous region (Fig. 74).

Sixteen species are recognized in this subgroup. Most species occur in America, from USA to South America including the Caribbean archipelago. One species is known only from India and another species occurs in southeastern Asia (Oriental region).

This subgroup seems to be a quite uniform monophyletic group characterized by synapomorphous structures exhibited in male genitalia (see above).

#### Key to species (non-American species are marked)

1. Male antenna modified, segments 3-10 distinctly enlarged (Fig. 126). ***H. platycornis*** Young (p. 163)
- Male antenna not modified, slender (Fig. 52) . . . . . 2
2. Elytra with deep lateral furrow (Fig. 141) . . . . . 3
- Elytra without lateral furrow (sometimes weakly depressed at same place) . . . . . 4
3. Ventral outline of penis basally evenly curved (Fig. 143); penis narrows quite abruptly towards long and almost parallel-sided apex (Fig. 142). ***H. hornii*** Crotch (p. 166)

- Ventral outline of penis close to base with a minute process (Fig. 135); penis narrows gradually towards apex (Fig. 134).
  - H. youngi** n. sp. (p. 165)
- 4. Apex of penis laterally expanded (Fig. 155).
  - H. inexpectatus** Young (p. 171)
- Apex of penis narrow (Fig. 66) . . . . . 5
- 5. Penis narrows evenly towards apex (Figs 53, 149) . . . . . 6
- Penis narrows abruptly towards apex (Figs 60, 72) . . . . . 7
- 6. Body elongated (Fig. 145); elytra without distinct colour pattern; penis apically with minute ventro-lateral expansion (Fig. 150).
  - H. longior** n. sp. (p. 169)
- Body subglobular; elytra with distinct colour pattern (Fig. 50); penis apically without expansions (Fig. 54) (India).
  - H. cardoni** Severin (p. 134)
- 7. Narrow apical part of penis quite short (Fig. 60); margin between elytra and epipleura clearly visible from above, (SE Asia).
  - H. subrotundatus** Motsch. (p. 137)
- Narrow apical part of penis long (Fig. 66); margin between elytra and epipleura for a long distance medially not visible from above . . . . . 8
- 8. Male protarsal claws distinctly thickened (Fig. 114); elytra with distinct colour pattern (Fig. 111).
  - H. kavanaughi** n. sp. (p. 158)
- Male protarsal claws not thickened; (species with or without elytral colour pattern) . . . . . 9
- 9. Basal half of penis broad (Fig. 121); big species (length of body 3.02–3.18 mm).
  - H. peninsularis** Young (p. 161)
- Basal half of penis narrower (Fig. 66); generally smaller species (length of body max. 3.02 mm) . . . . . 10
- 10. Apical half of paramere broad (Fig. 109); in apical half ventral outline of penis almost straight (Fig. 108).
  - H. concolor** Sharp (p. 157)
- Apical half of paramere narrower (Fig. 68); in apical half ventral outline of penis at least slightly curved (Fig. 66) . . . . . 11
 

(Determination is uncertain from this point onwards, because of considerable morphological overlap between different taxa. Species status unclear!)
- 11. Narrow apical part of penis medially generally somewhat expanded (Fig. 101); elytra often with quite distinct colour pattern (Fig. 96).
  - H. pustulatus** (Melsh.) (p. 153)

- Narrow apical part of penis medially not expanded (Fig. 66); elytral colour pattern absent or different (Fig. 63) . . . 12
- 12. Ventral outline of penis quite abruptly bent downwards (Fig. 86, note the arrow); elytral punctures fine to very fine, rather sparse.
  - H. leconteii** Clark (p. 148)
- Ventral outline of penis evenly curved to almost straight, never abruptly bent downwards (Fig. 67); elytral punctures generally coarser and denser . . . . . 13
- 13. Body broad, posterior half pointed (Fig. 89); in general elytra laterally with quite distinct depression (Fig. 92).
  - H. brevipes** Sharp (p. 150)
- Body slightly elongated, posterior half not pointed (Fig. 63); elytra laterally sometimes with a slight depression.
  - H. davidis** Young (p. 141)
  - H. caraibus** Sharp (p. 144)
  - H. sharpi** Van den Branden (p. 145)

(For this complex of three taxa I am not able to construct any tentative key - I refer to the respective diagnosis and description.)

For description of species, see p. 134.

#### Species group 4 (sp. gr. *confossus*)

Length of body: 1.62–3.08 mm, breadth: 0.92–1.98 mm. Shape of body varies between elongate to globular. Colouration of body variable: unicoloured species to species with distinct colour pattern represented in the species group.

Head frontally rounded, medially often straightened and rarely medially slightly concave (Figs 534, 587). A number of species have an uneven outline: on each side of an almost straight medial part, distinctly concave (Fig. 515). Head frontally margined from eye to eye (Fig. 356). Many species have a more or less reduced margin, and margin sometimes indicated only by indistinct medial rudiments (Figs 546, 557). Male antenna exhibits great variation. Thus there are species with an unmodified slender antenna, species with an indistinctly thickened antenna, species with a distinctly thickened antenna etc. (Figs 182, 223, 343, 310). Shape of male antenna seems to be the most reliable feature in determination of species. Palpi in both sexes always simple.

Elytra: One species has elytral punctures provided with minute but clearly visible scales.

Ventral side: Stridulatory apparatus absent.

Legs: Male protarsal claws exhibit considerable variation. There are thus species with simple unmodified claws, species with symmetric extended claws and species with asymmetric extended claws (Figs 455, 486).

Male genitalia: Penis generally quite slender and apically distinctly curved downwards (Figs 212–213). Apical part of paramere always hooked (Fig. 220). There is considerable variation in details of penis apex and paramere apex. However, closely related species have generally similar or almost similar male genitalia, which makes determination difficult.

Sixty-nine species are with some hesitation recognized in this species group. Most species occur in Africa, but there are also a few species with a oriental distribution.

No definite synapomorphies can be demonstrated for this species group. It is most probably a paraphyletic subgroup, which still needs a lot of investigation.

#### Key to species (to be considered tentative)

Non-African species are marked with their range in brackets. Five species are excluded from the present key because only the female has been available for study. Their location in this species group is unclear and is based on examination of the female specimen and what is suggested in literature dealing with the taxon in question.

*H. duponti* Rg. (p. 189): probably close to *H. confossus*.

*H. brunneus* Guignot (p. 244): according to original description (GUIGNOT, 1961a) close to *H. spadix*.

*H. coracinus* Guignot (p. 284): possibly close to species *H. crassicornis*-*H. medialis*.

*H. macrocephalus* Gschw. (p. 288): probably close to *H. globulosus*.

*H. parameces* Guignot (p. 294): according to original description (GUIGNOT, 1958b) close to *H. capnius*.

- Penis symmetric (lacks lateral processes) . . . . . 3
- 3. Apical hook of paramere long (Fig. 240) . . . . . 4
- Apical hook of paramere shorter (Fig. 334) . . . . . 5
- 4. Apical segment of antenna in male distinctly enlarged (Fig. 236); bigger species (length 2.32–2.66 mm).
  - H. senegalensis** Rég. (p. 198)
- Apical segment of antenna in male not enlarged (Fig. 405); small species (length 2.06–2.30 mm). **H. eximus** n. sp. (p. 250)
- 5. Male antenna strongly modified (Fig. 249).
  - H. aristidis** Leprieur (p. 204)
- Male antenna slender or differently modified . . . . . 6
- 6. Second segment of male antenna distinctly enlarged and modified (Fig. 317) . . . . . 7
- Second segment of antenna slender, not modified . . . . . 8
- 7. Antennal segments 3–8 in male almost equally broad (Fig. 317).
  - H. satanas** Guignot (p. 224)
- Antennal segments 3–8 in male not equally broad (segments narrow distinctly from eighth segment towards third segment (Fig. 326). **H. satanoides** Ped. & Rocchi (p. 226)
- 8. Eighth antennal segment in male with sharp lateral process (Fig. 382). **H. brownei** Omer-Cooper (p. 242)
- Male antenna different . . . . . 9
- 9. Apical antennal segment with a distinct lateral process (Fig. 420). **H. validicornis** Rég. (p. 254)
- Male antenna different . . . . . 10
- 10. Penis posterior to apex strongly expanded (Fig. 559); small species (length 1.62–1.80 mm).
  - H. charactes** Guignot (p. 291)
- Shape of penis different; bigger species (min. length 1.82 mm) . . . . . 11
- 11. Penis distinctly curved inwards posterior to broad rounded apex (Fig. 566). **H. capnius** Guignot (p. 292)
- Apex of penis different . . . . . 12
- 12. Penis in dorsal view only slightly narrowing towards steeply bent apex (Figs 582, 608) . . . . . 13
- Penis in dorsal view different . . . . . 15
- 13. Head foremargin reaches eyes (Fig. 579); bigger species (length 2.90–3.08 mm). **H. concii** Bil. & Ped. (p. 298)
- Head foremargin does not reach eyes (Fig. 606); small species (length 2.14–2.24 mm) (SE Asia) . . . . . 14

14. Head frontally with clearly visible punctures.  
**H. similis** n. sp. (p. 306)

– Head frontally with very indistinct punctures.  
**H. maai** n. sp. (p. 304)

15. Apex of penis long, narrow, only slightly curved downwards (Fig. 617); (oriental region).  
**H. fractus** Sharp (p. 308)

– Apex of penis always distinctly curved downwards . . . . . 16

16. Frontal outline of downwards curved penis apex straight (Fig. 437) or concave (Fig. 521) . . . . . 17

– Frontal outline of penis rounded (eg. Figs 300, 333) . . . . . 34

17. Frontal outline of head uneven (Fig. 498); male protarsal claws long, generally asymmetric (Fig. 501) (cf. also *H. medialis*, p. 282)  
. . . . . 18

– Frontal outline of head evenly curved (Fig. 425); male protarsal claws simple or medium long, often symmetric . . . . . 23

18. Large species (length 2.70–2.94 mm); penis voluminous (Fig. 503).  
**H. unguicularis** n. sp. (p. 273)

– Smaller species (length max. 2.70 mm); penis smaller . . . . . 19

19. Male antenna medially with indistinctly enlarged segments (Fig. 526).  
**H. tydaeus** n. sp. (p. 280)

– Male antenna medially with distinctly enlarged segments (Fig. 492) . . . . . 20

20. Male antenna medially with strongly enlarged segments (Fig. 492) . . . . . 21

– Male antenna medially with moderately enlarged segments (Fig. 516) . . . . . 22

21. Seventh segment of male antenna almost two times broader than segment eight (Fig. 485); male protarsal claws (Fig. 486).  
**H. crassicornis** (Kolbe) (p. 268)

– Seventh segment of male antenna only slightly broader than segment eight (Fig. 492); male protarsal claws (Fig. 493).  
**H. madagascariensis** Rég. (p. 270)  
 (Note! Separation of species in point 22 very tentative - synonymy of taxa cannot be excluded.)

22. Medial segments of male antenna generally broader and antenna longer (Fig. 516); elytral microsculpture often strongly reduced.  
**H. longicornis** Sharp (p. 278)

– Medial segments of male antenna generally narrower and antenna shorter (Fig. 507); elytral microsculpture generally well developed.  
**H. cibratus** Sharp (p. 274)

23. Downwards projecting penis apex long in relation to length of rest of penis (Fig. 429). **H. dama** Guignot (p. 256)

– Downwards projecting penis apex shorter in relation to length of rest of penis (Fig. 416) . . . . . 24

24. Body broad, apical half somewhat pointed (Fig. 410); apical hook of paramere sharp and straight (Fig. 417).  
**H. spissicornis** Rég. (p. 252)

– Body more elongate, apical half rounded (Fig. 545); apical hook of paramere more blunt at the point and slightly curved (Fig. 550) . . . . . 25

25. Sinuate apex of penis projects partly forwards, tip obtuse (Fig. 249); apex weakly attached to rest of penis.  
**H. globulosus** Gschw. (p. 285)

– Apex of penis projects downwards (Fig. 267); penis apex firmly attached to rest of penis . . . . . 26

26. Penis apex for a quite long distance narrow (Fig. 266).  
**H. asemus** n. sp. (p. 209)

– Penis apex broader (Fig. 539) . . . . . 27

27. Penis apex almost obtuse (Fig. 540).  
**H. medialis** B.-Br. (p. 282)

– Penis apex pointed (Fig. 479) . . . . . 28

28. Penis apex long (Fig. 479). **H. guignoti** Omer-Cooper (p. 267)

– Penis apex shorter (Fig. 471) . . . . . 29

29. Medial segments of male antenna sharp-edged (Fig. 469).  
**H. nilssoni** n. sp. (p. 265)

– Medial segments of male antenna with rounded edges (Fig. 461) . . . . . 30

30. Male antenna broadest apically (Fig. 434) . . . . . 31

– Male antenna broadest medially (Fig. 461) . . . . . 32

31. Apical segments of male antenna broad (Fig. 434).  
**H. verisae** Bil. & Rocchi (p. 259)

– Apical segments of male antenna narrower (Fig. 441).  
**H. angusticornis** n. sp. (p. 260)

32. Three apical segments of male antenna distinctly narrower than enlarged medial segments (Fig. 447). **H. tristis** Guignot (p. 261)

– Apical segments of male antenna only slightly narrower than enlarged medial segments (Fig. 461) . . . . . 33

33. Pronotal punctures concentrated to marginal regions of pronotum (Fig. 462); scutellar reticulation clearly discernible.  
**H. imitator** n. sp. (p. 264)

- Pronotal punctures more evenly distributed (Fig. 454); scutellar reticulation indistinct. **H. subparallelus** Gschw. (p. 263)
- 34. Male antenna with distinctly enlarged medial segments (Figs 331, 343) . . . . . 35
- Male antenna evenly broad or with weakly enlarged medial segments (Figs 277, 290) . . . . . 38
- 35. Male antenna narrows evenly from segment four towards apex (Fig. 349) . . . . . 36
- Male antenna with fourth segment narrower than fifth (Fig. 343) . . . . . 37
- 36. Male antenna with segments three to five sharp-edged (Fig. 349).  
**H. cristatus** Guignot (p. 233)
- Male antenna with rounded segments (Fig. 243).  
**H. flammulatus** Sharp (p. 202)
- 37. Male antenna with seventh segment broadest (Fig. 331); body almost parallel-sided (Fig. 329).  
**H. pilitibiis** Omer-Cooper (p. 228)
- Male antenna with fifth segment broadest (Fig. 343); body oval (Fig. 341).  
**H. amplicornis** Rég. (p. 231)
- 38. Male antenna with segment eight distinctly broader than segments seven and nine (Fig. 310). **H. difformis** Rég. (p. 222)
- Male antenna different . . . . . 39
- 39. Male antenna long, with segments five to eleven distinctly enlarged (Fig. 283); head foremargin distinct from eye to eye . . . . . 40
- Male antenna different (if long and segments apically enlarged, head foremargin reduced at eyes) . . . . . 43
- 40. Elytra without distinct colour pattern.  
**H. flebilis** Guignot (p. 215)
- Elytra with colour pattern (rarely quite vague) (Fig. 288) . . . . . 41
- 41. Male antenna with segments seven to eleven almost evenly broad, ninth and tenth segments on one side edged (Fig. 304).  
**H. bomansi** Guignot (p. 220)
- Male antenna with three apical segments slightly narrower than segments seven and eight; ninth and tenth segments not edged (Fig. 297) . . . . . 42
- 42. Large species (length 2.84–3.00 mm); male antenna with segments three to five somewhat enlarged (Fig. 297).  
**H. visendus** n. sp. (p. 219)

- Smaller species (length 2.50–2.76 mm); male antenna with segments three to five slender (Fig. 290).
  - H. megalocerus** Bil. & Ped. (p. 217)
- 43. Elytra with colour pattern (rarely indistinct) (eg. Fig. 355) . . . . . 44
  - Elytra without distinct colour pattern (sometimes elytron becomes gradually paler from suture to epipleuron) . . . . . 52
- 44. Male antenna with segments four to ten short (broader than long) (Fig. 588).
  - H. exochomoides** Rég. (p. 300)
- Male antenna different (segments longer than broad or length and breadth of segments almost equal (Fig. 364) . . . . . 45
- 45. Male antenna with somewhat enlarged segments (Figs 223, 364) . . . . . 46
  - Male antenna unmodified (segments sometimes very indistinctly enlarged) (Figs 199–200) . . . . . 49
- 46. Apical segment of male antenna broad, with a distinct apical extension (Fig. 364).
  - H. fernandoi** n. sp. (p. 236)
- Apical segment of male antenna narrower, lacks apical extension (Fig. 223) . . . . . 47
- 47. Body globular (Fig. 221); male antenna broadest at segments eight to ten (Fig. 223).
  - H. scholaeus** Guignot (p. 194)
- Body quite elongate (Fig. 355); male antennal segments almost equally broad or antenna broadest at segments four to seven . . . . . 48
- 48. Male antenna almost evenly broad (Fig. 357); penis broad (Fig. 359).
  - H. noumeni** Bil. & Rocchi (p. 235)
- Male antennae broadest at segments four to seven (Fig. 370); penis narrower (Fig. 371).
  - H. glaber** Guignot (p. 238)
- 49. Separate elytral punctures provided with a minute, clearly visible scale (50× magnification).
  - H. brevipilis** Guignot (p. 196)
- Separate elytral punctures nude (50× magnification) . . . . . 50
  - (Note! Separation of species at points 50-51 very tentative - synonymy cannot be excluded)
- 50. Penis almost evenly broad for a long distance (Fig. 201).
  - H. confossus** Guignot (p. 185)
- Penis narrows quite evenly towards apex (Fig. 212) . . . . . 51
- 51. Pronotum anteriorly often distinctly darkened (Fig. 208); curved apex of penis generally shorter (Fig. 213).
  - H. pescheti** Omer-Cooper (p. 189)

- Pronotum anteriorly not distinctly darkened (Fig. 215); curved apex of penis longer (Fig. 219). **H. postremus** Guignot (p. 193)
- 52. Ventral outline of penis in basal half distinctly expanded (Fig. 401). **H. sanfilippo** Bil. & Rocchi (p. 249)
- Ventral outline of penis in basal half not expanded (eg. Fig. 170) . . . . . 53
- 53. Male antenna modified, with enlarged segments (Figs 193, 376) . . . . . 54
- Male antenna not modified, slender (male variation of *H. parvulus* apically with weakly enlarged segments) (Figs 167–168) . . . . . 57
- 54. Body globular (Fig. 191); male antenna broadest at segments seven to nine (Fig. 193). **H. fulvicollis** Guignot (p. 183)
- Body elongated (Fig. 374); broad segments of male antenna differently arranged (Figs 175, 376, 392) . . . . . 55
- 55. Male antenna broadest at segments five to seven (Fig. 376). **H. oblongiusculus** Rég. (p. 241)
- Male antenna broadest at segments four to eight (Fig. 175) . . . . . 56
- 56. Larger species (length 2.32 mm); male antenna (Fig. 175). **H. spadix** Guignot (p. 178)
- Small species (length 2.00–2.18 mm); male antenna (Fig. 392). **H. occidentalis** Guignot (p. 247)
- 57. Penis with a long, narrow apical part (Fig. 272) . . . . . 58
- Apical part of penis short (Fig. 169) . . . . . 60
- 58. Body oblong (Fig. 254); downwards curved penis apex long (Fig. 259). **H. absonus** Guignot (p. 206)
- Body globular (Fig. 269); downwards curved penis apex short (Fig. 273) . . . . . 59
- 59. Small species (length 1.94–2.16 mm); dorsal side of body submat, microsculptured. **H. abraeoides** Rég. (p. 211)
- Larger species (length 2.42 mm); dorsal side of body rather shiny, although with microsculpture. **H. piceus** Guignot (p. 213)

(Note! From point 60 onwards determination very tentative.)

- 60. Body oblong (Fig. 335) . . . . . 61
- Body globular (Fig. 186) . . . . . 62
- 61. Head frontally obtuse (Fig. 336); body elongate (Fig. 335); penis slender (Fig. 338). **H. oblongus** Omer-Cooper (p. 229)

- Head frontally generally rounded (Fig. 165); body broader (Fig. 164); penis broader (Fig. 169). **H. parvulus** Rég. (p. 174)
- 62. Head foremargin reaches eyes (Fig. 159); penis medially almost parallel-sided (Fig. 161). **H. vicinus** Guignot (p. 172)
- Head foremargin reduced at eyes (Fig. 181); penis narrows slightly towards apex medially (Fig. 183) . . . . . 63
- 63. Apical hook of paramere robust (Fig. 185). **H. granosus** Guignot (p. 179)
- Apical hook of paramere pointed, less robust (Fig. 190). **H. pyrrus** Guignot (p. 181)

For descriptions of species, see p. 172.

#### **Species group 5 (sp.gr. *balfourbrownei*)**

Length of body: 3.46–4.00 mm, breadth: 2.08–2.24 mm. Body somewhat elongated. Without distinct colour pattern.

Head: Frontal outline of head rounded. Head frontally in middle with fine margin (Fig. 620). Male antenna distinctly modified (with enlarged segments) (Fig. 621). Palpi simple.

Ventral side: Stridulatory apparatus absent.

Legs: Male protarsal claws simple. Third segment of male protarsi asymmetric (Fig. 622).

Male genitalia: Penis slender, apically obtuse (Fig. 623). Paramere hooked. Apical part of paramere strongly bent forwards (Fig. 625).

A monobasic species group (see below under Note!), known only from Malaysia (Oriental region).

The character, elytral punctures coarsest posteriorly on disc, is most probably an apomorphic character of this species group.

Note! With some hesitation I also include *H. semirufus* Zimm. in this subgroup although the male of this species is unknown. Female characters fit quite well with what is diagnostic for *H. balfourbrownei* n.sp., except that the *H. semirufus* female has a truncate elytral apex (Fig. 630). As long as the male of *H. semirufus* is unknown, its position remains unclear.

For description of species, see p. 310.

#### **Species group 6 (sp. gr. *pumilus*)**

Length of body: 1.74–2.26 mm, breadth: 0.96–1.38 mm. Shape of body varies between globular and parallel-sided depending on species. Dorsal aspect of body without distinct colour pattern.

Head: Between eyes, rounded; medially generally somewhat straightened. Frontal margin always present but at eyes always reduced. Visible only medially, sometimes very indistinct and hardly discernible (Figs 639, 651). Both sexes with unmodified antenna and palpi.

Ventral side: Without stridulatory apparatus.

Legs: Male protarsal claws simple, unmodified.

Male genitalia: Penis always with a distinct apex provided with a strongly curved tip (Figs 642, 667). Paramere apically always hooked and near apex with a distinct fold (Fig. 655).

Six species are recognized in this species group. Five species have an Oriental range, while one species occurs in Australia.

I believe that this species group is a monophyletic unit, however characterized by the uncertain synapomorphy: Small body size. Monophly is supported by the fact that all species in this subgroup have a basically similar penis provided with a distinct apex on a different level than the basal part of the penis. A similar structure lacking in outgroups.

#### Key to species

1. Penis apex very strongly bent (apex points almost at base of penis) (Fig. 667). . . . . 2
- Penis apex less strongly bent (apex points almost straight downwards (Figs 635, 642). . . . . 3
2. Body almost parallel-sided (Fig. 663); apex of penis almost evenly broad (Fig. 666). **H. parallelus** Sharp (p. 325)
- Body quite globular (Fig. 657); apex of penis narrows slightly anteriorly (Fig. 660). **H. pisiformis** n.sp. (p. 323)
3. Elytral punctuation coarse, quite dense. **H. saundersi** n.sp. (p. 321)
- Elytral punctuation rather fine to very fine, rather sparse to sparse. . . . . 4
4. Body quite globular (Fig. 644); apex of penis with edged outline (Fig. 647). **H. laosensis** n.sp. (p. 319)
- Body somewhat elongate (Fig. 631); apex of penis with rounded outline (Fig. 641). . . . . 5
5. Apex of penis almost parallel-sided, longer (Fig. 634).  
**H. pudicus** (Clark) (p. 314)
- Apex of penis narrows towards extreme apex, short (Fig. 641).  
**H. pumilus** Sharp (p. 318)

For description of species, see page 314.

### Species group 7 (sp.gr. *gabonicus*)

Length of body: 3.00–3.60 mm, breadth: 2.00–2.26 mm. Shape of body fairly globular to somewhat elongated (Figs 681, 689). Both unicoloured species and species with dorsal colour pattern are represented in the species group.

Head: Male with frontal outline medially straight to slightly rounded. Margined from eye to eye except in one species where margin reduced, not discernible at eyes (Figs 671, 682). Frontal outline of female head rounded. Male antenna quite slender, almost unmodified (Fig. 673) or with distinctly enlarged segments (Fig. 683). Male maxillary palpus always modified, flattened, in one species triangle-shaped (Figs 676, 684).

Ventral side: Without stridulatory apparatus.

Legs: Male protarsal claws symmetric, simple or extended (Fig. 677).

Male genitalia: Principally as in species group 4. Penis quite slender, apically quite evenly curved, tip pointed (Fig. 686). Paramere with distinct hook (Fig. 695).

Three species are recognized in this subgroup, all of which occur in Africa.

Outgroup-comparison highly indicates apomorphy of modified male maxillary palpus. Thus this feature, exhibited in *Hydrovatus* only by these three species, is probably a synapomorphy, and the species group is accordingly monophyletic.

## Key to species

For description of species, see page 327.

### Species group 8 (sp.gr. *roccchii*)

Externally very similar to species group 7.

Length of body: 3.38 mm, breadth: 2.10 mm. Body fairly globular (Fig. 696). Body without distinct colour pattern.

Head: Male head medially straight, margined from eye to eye (Fig. 697). Male antenna distinctly modified, with enlarged segments (Fig. 698). Male maxillary palpus simple.

Ventral side: Stridulatory apparatus absent.

Legs: Male protarsal claws symmetric, somewhat extended.

Male genitalia: As in species group 7.

Female: Unknown.

On species with African distribution is recognized in this species group (*H. roccii* n.sp.).

Most probably an exceptional species, belonging to species group 7 or possibly species group 4. The only actual difference from species group 7 is the unmodified male maxillary palpus.

For description of species, see page 334.

#### **Species group 9 (sp.gr. *acuminatus*)**

Length of body: 2.00–2.72 mm, breadth: 1.20–1.70 mm. Shape of body quite uniform: quite globular to slightly elongated (Figs 702, 741). Body dorsally without distinct colour pattern. Rarely a very indistinct pattern may be discerned.

Head: Outline of frontal part of head rounded, medially often to a variable degree straightened. From eye to eye margined but margin often reduced. Sometimes only indistinct rudiments of margin can be discerned (Figs 748–750). Male antenna and palpi always simple, not with enlarged segments (Fig. 751).

Ventral side: Without stridulatory apparatus.

Legs: Male protarsal claws simple.

Male genitalia: Penis generally more or less straight, in a few species apex bent downwards (Figs 732, 719). Shape of penis apex variable. Apex of paramere hooked. Apical hook sometimes reduced or somewhat extended (Figs 746, 713).

Eight species are recognized in this species group with a comparatively wide range: Africa, the Oriental region, Australia and Micronesia. Representatives of this species group are also known from areas in the southern Palearctis: Turkey, Iraq, China, South Japan.

The status of this species group is unclear and needs further study. Possibly a paraphyletic group, but similar details in the shape of the

penis apex, exhibited by many species in the subgroup, may provide a synapomorphy of the subgroup. Further splitting may become necessary?

#### Key to species

1. Penis almost evenly broad, apically with a broad but quite short, sharp-cornered extension (Fig. 752).  
**H. acuminatus** Motsch. (p. 351)
  - Penis apex different. . . . . 2
2. Penis becomes broader towards well-defined, quite narrow apex (Fig. 711) . . . . . 3
- Penis almost evenly broad or narrows gradually towards apex (Figs 744, 705) . . . . . 4
3. Tip of penis obtuse (Fig. 712); paramere apex distinctly extended (Fig. 713).  
**H. fasciatus** Sharp (p. 339)
  - Tip of penis pointed (Fig. 719); paramere apex with only slight extension (Fig. 720). **H. irianensis** n.sp. (p. 342)
4. Penis apically curved inwards slightly posterior apex (Fig. 705).  
**H. ovalis** Sharp (p. 336)
  - Penis not curved inwards posterior to apex. . . . . 5
5. Apical hook of paramere short, weakly developed (Fig. 746).  
**H. baptus** Guignot (p. 349)
  - Apical hook of paramere long, well developed (Fig. 740). . . . 6
6. Extreme apex of penis narrow (Fig. 724).  
**H. reclusus** Guignot (p. 343)
  - Apex of penis broad (Fig. 731). . . . . 7
7. Apex of penis slightly curved downwards (Fig. 739); penis posterior to apex distinctly enlarged (Fig. 738).  
**H. schawalleri** n.sp. (p. 348)
  - Apex of penis straight (Fig. 732); penis posterior to apex not enlarged (Fig. 731). **H. collega** Guignot (p. 345)

For description of species, see page 336.

#### Species group 10 (sp.gr. *parallelipennis*)

Length of body: 3.24–4.40 mm, breadth: 1.88–2.52 mm. Body oval or almost parallel-sided (Figs 756, 769). Unicoloured species, except one species which often has a quite distinct colour pattern.

Head: Frontal outline rounded, medially generally straightened. Margined, but margin often reduced (broken in middle or reduced close to eyes) (Figs 757, 771). Male antenna simple, not modified (Fig. 758). Palpi simple.

Ventral side: Stridulatory apparatus absent.

Legs: Protarsal claws simple, except in the male of one species: claws distinctly thickened, symmetric (Fig. 765).

Male genitalia: Penis principally similar throughout subgroup. Basally on each side with a strengthening lobe and apex quite long and somewhat curved downwards (Fig. 760). Extreme tip of penis quite narrow but obtuse (Fig. 766). Paramere apex with a distinct hook (Fig. 761).

Five species are recognized in this species group known only from the Ethiopian region.

Most probably a monophyletic species group defined by probable synapomorphy (narrow but obtuse apex of penis).

## Key to species

For description of species, see pages 359.

### Species group 11 (sp.gr. *oblongipennis*)

Length of body: 1.92–5.02 mm, breadth: 1.20–3.16 mm. Body shape varies between quite globular and somewhat elongated (Figs

990, 937). Posterior half of body rarely somewhat pointed (Fig. 937). Most species unicoloured – species with dorsal colour pattern being scarce.

Head: Frontal outline of head varies between evenly rounded and rounded but medially distinctly straightened. Always margined but margin often reduced: not discernible at eyes; indicated only by indistinct medial rudiments; broken in middle (Figs 788, 810, 826). Male antenna slender, not modified (Fig. 789), except in one species, which has indistinctly enlarged segments (Fig. 1064). Male palpi always simple, unmodified.

Ventral side: Provided with stridulatory apparatus. In most species apparatus consists of numerous minute ridges forming a file, located approximately between metathorax and metacoxal plate (Fig. 3). In many species apparatus modified or reduced: Ridges may be enlarged and their number reduced. The most extreme file has only a few ridges (Figs 1031–1032). In one species only fine striae indicate a file, and in three species the file has disappeared. Their placement in this species group is supported by a number of other features exhibited, which are characteristic for the subgroup. Other solutions would be difficult to defend.

Legs: Male protarsal claws simple, unmodified. In many species modified and symmetric or asymmetric. Modification is mostly exhibited as a basally thickened and strongly bent claw (Fig. 820).

Male genitalia: Shape of penis variable. Often quite robust and apex bent downwards (Figs 840, 897). Apical outline of penis varies between truncate and sharply pointed (Figs 1085, 806). Penis of many species provided with strengthening lateral lobes (Fig. 848). In dorsal view penis varies between quite broad to very broad (Fig. 1021). Penis apex in one species with lateral hairs (Fig. 891), and, in a few species, penis apex “hammer”-shaped (Fig. 981). Paramere apically always hooked (Fig. 794). Hook sometimes reduced (Fig. 887) or sharp and almost straight (Fig. 1087).

Distribution: Representatives of the species group are distributed in the Ethiopian region, the Oriental region, Australia and in the southwestern Palearctic and southern Japan.

No synapomorphous characters can be demonstrated for this group. Accordingly, I find it probable that it is a paraphyletic group which urgently need further examination.

### Key to species (to be considered tentative)

Species occurring outside Africa are marked with their approximate range in brackets. Two species are excluded from the key because only the female has been available for examination. Their location in this species group is primarily based on study of female specimens, as well as statements in papers dealing with the species in question.

*H. bedoanus* Bruneau de Miré & Legros (p. 422): probably close to *H. oblongipennis*.

*H. seydeli* Guignot (p. 478): according to original description (GUIGNOT 1953c) close to *H. bredoi*.

9. Penis narrows almost evenly towards obtuse apex (dorsal view) (Fig. 986); body dorsally with colour pattern (Fig. 983).  
**H. sobrinus** Omer-Cooper (p. 435)

– Penis different; body dorsally rarely with colour pattern . . . . . 10

10. Penis broad, narrows almost evenly towards long, moderately curved apex; penis ventrally with a few stiff hairs (Figs 806–807).  
**H. insolitus** Guignot (p. 377)

– Penis different . . . . . 11

11. Penis laterally in basal half with strengthening lobes (Figs 813, 832). . . . . 12

– Penis laterally without distinct strengthening lobes (Figs 800, 1015). . . . . 30

12. Penis apex “hammer”-shaped (Fig. 975). . . . . 13

– Penis apex not “hammer”-shaped . . . . . 15

13. Apical half of body quite pointed (Fig. 977); penis basally broad (Fig. 980); outline of penis apex (Fig. 981).  
**H. compactus** Sharp (p. 433)

– Apical half of body rounded (Fig. 971); penis basally narrower (Fig. 974); outline of penis apex different (Figs 969, 975). . . . . 14

14. Penis apex dorsally strongly sinuate (Fig. 975).  
**H. stappersi** Guignot (p. 432)

– Penis apex dorsally weakly sinuate (Fig. 969).  
**H. nigricans** Sharp (p. 429)

15. Male protarsal claws simple, not distinctly modified (Fig. 869) . . . . . 16

– Male protarsal claws modified (often asymmetric) (Figs 838, 820). . . . . 18

16. Apex of penis long, ventral outline straight, extreme apex distinctly curved downwards (Fig. 814). **H. gravis** Guignot (p. 380)

– Apex of penis shorter, slightly curved downwards (Fig. 856) (Oriental region, Australia) . . . . . 17

17. Penis abruptly expanded posterior to apex (Fig. 855) (Oriental region).  
**H. picipennis** Motsch. (p. 395)

– Penis gradually expanded posterior to apex (Fig. 870) (Australia)  
**H. weiri** n.sp. (p. 399)

18. Outline of lateral strengthening lobe of penis straight (Fig. 879).  
**H. obsoletus** Peschet (p. 402)

– Outline of lateral strengthening lobe of penis distinctly curved (Fig. 823). . . . . 19

19. Penis apex with distinct lateral flaps (Figs 916, 926). . . . . 20

- Penis apex lacks distinct lateral flaps (Fig. 901) . . . . . 21
- 20. Lateral flaps of penis apex project forwards (Fig. 926); male protarsal claw more slender (Fig. 923) (Philippines).  
  - H. navigator** n.sp. (p. 416)
- Lateral flaps of penis apex project downwards (Fig. 916); male protarsal claw thick (Fig. 914) (New Guinea, Australia).  
  - H. nigrita** Sharp (p. 412)

(Note! Determination between point 20–29 is very tentative.)
- 21. Head foremargin complete or near eyes broken for a very short distance (Figs 905, 938) . . . . . 22
- Head foremargin never complete, always broken for quite a long distance near eyes (Figs 818, 826–827). . . . . 27
- 22. Penis apex somewhat undulate (Fig. 909).  
  - H. omentatus** Guignot (p. 411).
- Penis apex evenly curved or rarely very indistinctly undulate (Figs 892, 942) . . . . . 23
- 23. Penis apex laterally with distinct hairs (Fig. 891).  
  - H. perrinae** Bil. & Ped. (p. 406)
- Penis apex without distinct lateral hairs (Fig. 941) . . . . . 24
- 24. Large species (length 4.08–5.02 mm); lateral strengthening lobes of penis clearly visible from above (Fig. 941).  
  - H. oblongipennis** Rég. (p. 419)
- Smaller species (max. length 3.92 mm); lateral strengthening lobes of penis not or hardly visible from above (Fig. 900) . . . . . 25
- 25. Paramere hook well developed (Fig. 903).  
  - H. lintrarius** Guignot (p. 408)
- Paramere hook weakly developed (Fig. 954) . . . . . 26
- 26. Body broad (Fig. 948); penis not curved inwards before slender apex (Fig. 952).  
  - H. guignotianus** Guignot (p. 425)
- Body slightly elongated (Fig. 955); penis weakly curved inwards before quite slender apex (Fig. 959).  
  - H. pederzanii** Bil. & Rocchi (p. 427)
- 27. Penis apex almost straight, ventrally with hairs (Fig. 822).  
  - H. hamatus** Guignot (p. 382)
- Penis apex distinctly bent downwards, ventrally nude (Fig. 832) (Oriental region, Australia) . . . . . 28
- 28. Penis narrows evenly towards apex (Fig. 831) (Oriental region).  
  - H. castaneus** Motsch. (p. 385)
- Penis slightly expanded posterior to apex (Fig. 839) (Oriental region, Australia) . . . . . 29

29. Penis often narrower (Fig. 847) (Oriental region).  
**H. bonvouloiri** Sharp (p. 392)

– Penis often broader (Fig. 839) (Oriental region, Australia).  
**H. rufoniger** (Clark) (p. 388)

– Apex of penis (Fig. 840) (Oriental region).  
**H. r. rufoniger** (Clark)

– Apex of penis (Fig. 842) (Australia). **H. r. politus** Sharp

30. Penis long, quite slender, apically quite obtuse (Figs 799, 1053)  
. . . . . 31

– Penis shorter, broader, apically more pointed (Figs 1000, 1021)  
. . . . . 34

31. Apex of penis without lateral flaps (Fig. 800) (SW Palearctis).  
**H. cuspidatus** (Kunze) (p. 372)

– Apex of penis with small lateral flaps (Fig. 1066) . . . . . 32

32. Penis expands distinctly towards apex (Fig. 1065); stridulatory apparatus with approximately 20 clearly visible ridges (50 x magnification). **H. galpini** Omer-Cooper (p. 469)

– Penis does not expand distinctly towards apex (Fig. 1046); stridulatory apparatus with about 30 ridges or more . . . . . 33

33. Penis narrower (Fig. 1053); stridulatory apparatus with numerous minute ridges; small species (length 2.28–2.74 mm).  
**H. reticuliceps** Rég. (p. 463)

– Penis quite broad (Fig. 1046); stridulatory apparatus with about 30 minute but clearly visible ridges (50 x magnification); larger species (length 2.72–3.02 mm). **H. facetus** Guignot (p. 460)

34. Paramere apex straight (Fig. 1002). **H. simoni** Rég. (p. 441)

– Paramere apex curved (Figs 1080, 1016) . . . . . 35

35. Penis apex long, slender, hook-shaped (Fig. 1079).  
**H. impunctatus** Guignot (p. 472)

– Penis apex different . . . . . 36

36. Dorsal portion of penis apex projects forewards (Fig. 1041).  
**H. dentatus** Bil. & Ped. (p. 459)

– Dorsal portion of penis apex bent downwards (Fig. 1015)  
. . . . . 37  
(Note! Determination very tentative from point 37 onwards.)

37. Body quite broad, its posterior half somewhat pointed (Fig. 1011); male genitalia (Figs 1014–1016).  
**H. nefandus** Omer-Cooper (p. 448)

– Posterior half of body rounded (Fig. 1017); male genitalia different . . . . . 38

38. Aedeagus (Figs 790–794) (Oriental region, S Japan).  
**H. seminarius** Motsch. (p. 368)

– Aedeagus different (Ethiopian region) . . . . . 39

39. Stridulatory apparatus strongly modified (two tooth-shaped tubercles in a depressions with a sharp edge) (Fig. 1032).  
**H. deserticola** (**H. fallax** morph) (p. 456)

– Stridulatory apparatus weakly modified (with eight to about fifteen ridges) (Fig. 1031) . . . . . 40

40. Stridulatory apparatus with eight clearly visible ridges (Fig. 1031). **H. deserticola** (incl. **H. marlieri** and **H. sporas**) (p. 454)

– Stridulatory apparatus with about fifteen minute ridges.  
**H. cessatus** Guignot (p. 451)

– Body fairly globular (Fig. 1017); elytral punctuation fine, sparse.  
**H. c. cessatus** Guignot

– Body narrower (Fig. 1024); elytral punctuation coarser, denser.  
**H. c. australis** n.ssp.

For description of species, see pages 368.

#### Species group 12 (sp.gr. *villiersi*)

Length of body: 3.68–4.72 mm, breadth: 2.20–2.88 mm. Body quite globular to somewhat elongated, unicoloured, never with colour pattern (Figs 1130, 1122).

Head: Principally similar throughout species group. Frontally rounded, medially somewhat straightened, and from eye to eye margined (Fig. 1092). Male antenna and palpi slender, not modified.

Ventral side: Provided with stridulatory apparatus, which is principally similar to ground-plan of apparatus (with numerous minute ridges) (see, species group 11 above).

Legs: Male protarsal claws in most species modified, asymmetric (Fig. 1108). *H. unguiculatus* with extended but almost symmetric protarsal claws (Fig. 1101).

Male genitalia: Principally similar in all species of the species group. Apex of penis distinct, with lateral expansions (Figs 1095, 1102). Paramere hooked (Fig. 1104).

Six species are distinguished in this solely Ethiopian species group.

Most probably a monophyletic subgroup of species belonging to the *Hydrovatus* characterized by the possession of a stridulatory apparatus. The enlarged penis apex, unique for this species group, is

an apomorphic character which unifies the five species into a monophyletic group.

Key to species (to be regarded as tentative)

1. Ventral outline of penis apex truncate (Figs 1137–1138); body quite globular (Fig. 1130). **H. villiersi** Guignot (p. 489)
- Ventral outline of penis apex not or only somewhat truncate (Figs 1096, 1128); if penis apex truncate, body somewhat elongated (Fig. 1122) . . . . . 2
2. Body quite globular (Fig. 1091); penis apex slender (Fig. 1095). **H. vulpinus** n.sp. (p. 480)
- Body somewhat elongated (Fig. 1098); apex of penis broader (Fig. 1102) . . . . . 3
3. Penis narrows quite abruptly to apex (Fig. 1128). **H. contumax** Guignot (p. 488)
- Penis narrows evenly or almost evenly to apex (Fig. 1120) . . . 4
4. Penis short, robust, strongly curved (Fig. 1120); elytral punctures between suture and discal row of punctures very fine. **H. niger** Gschw. (p. 485)
- Penis longer, quite slender, moderately curved or almost straight (Figs 1110, 1103); elytral punctures between suture and discal row of punctures somewhat coarser . . . . . 5
5. Apical half of penis narrow (lateral view); ventral outline of penis partly straight (Fig. 1103); male protarsal claws almost unmodified, slightly extended but almost symmetric (Fig. 1101). **H. unguiculatus** n.sp. (p. 481)
- Apical half of penis broader (lateral view); ventral outline of penis curved (Fig. 1110); male protarsal claws distinctly modified, not extended but strongly asymmetric (Fig. 1108). **H. mucronatus** Rég. (p. 482).

For description of species, see pages 480.

**Species group 13 (sp.gr. *pulcher*)**

Length of body: 3.76–5.28 mm, breadth: 2.40–3.56 mm. Body shape varies between globular and somewhat elongated (Figs 1223, 1191). Colour pattern of body variable. Unicoloured species and species with a more or less distinct colour pattern are represented in this subgroup (Figs 1223, 1141).

Head: Frontally rounded, medially somewhat straightened. From eye to eye margined (Fig. 1142). Male antenna and palpi always unmodified.

Ventral side: Provided with stridulatory apparatus with minute ridges (approximately as in Fig. 3).

Legs: Protarsal claws of male generally simple. In one species I have observed slight asymmetry (see below) (Fig. 1221).

Male genitalia: Penis medially broad to fairly broad, narrows apically, and extreme apex mostly distinctly curved downwards (Figs 1188–1189). Paramere apex distinctly hooked (Fig. 1190).

Fourteen species are recognized in this species group, which has an Ethiopian distribution.

A quite uniform subgroup of *Hydrovatus*, which is particularly characterized by large body and penis shape. Possibly a paraphyletic group, because I cannot demonstrate any apomorphs in common for the different species.

#### Key to species (to be considered tentative)

*H. uniformis* (Fairmaire) (p. 516) is excluded from the key because the single male examined lacked penis. Possibly this species can be separated from the other species in this group by its exhibiting slightly asymmetric male protarsal claws (Fig. 1221). This feature is, however, difficult to see and may easily be overlooked.

1. Large species (length 3.76–4.84 mm) . . . . . 2
- Larger species (length 5.20–5.28 mm) (male unknown).
  - H. pilula* Guignot (p. 519)
2. Extreme penis apex slightly bent downwards (Fig. 1182) . . 3
- Extreme penis apex distinctly curved downwards (Figs 1189, 1164) . . . . . 4
3. Apical hook of paramere long (Fig. 1177).
  - H. pulcher* Gschw. (p. 503)
- Apical hook of paramere shorter (Fig. 1183).
  - H. vulneratus* n.sp. (p. 505)
4. Penis narrows almost evenly towards apex (Figs 1214, 1169) . . . . . 5

- Penis narrows more abruptly towards apex (Figs 1195, 1207) . . . . . 7
- 5. Apical hook of paramere long (Fig. 1171); penis broad (Fig. 1169). **H. cruentatus** Kolbe (p. 501)
- Apical hook of paramere shorter (Fig. 1217); penis narrower (Fig. 1214) . . . . . 6
- 6. Male elytral reticulation discally clearly visible; body colour almost black; generally larger species (length 4.40-4.60 mm). **H. confusus** Rég. (p. 515)
- Male elytral reticulation discally indistinct; body colour dark ferruginous; generally smaller species (length 3.96-4.48 mm). **H. frater** Rég. (p. 512)
- 7. Penis narrows abruptly to apex (Fig. 1144); elytra with distinct colour pattern (Fig. 1141) . . . . . 8
- Penis narrows more gradually to apex (Figs 1207, 1195); elytra generally with more vague colour pattern . . . . . 9
- 8. Penis apex with ventral outline uneven (Fig. 1145); penis apically broad (Fig. 1144). **H. balneator** Guignot (p. 494)
- Penis apex with ventral outline almost straight (Fig. 1151); penis apically slightly narrower (Fig. 1150). **H. sitistus** Omer-Cooper (p. 496)
- 9. Body broad, with quite distinct colour pattern (Fig. 1154); downwards bent penis apex quite short (Fig. 1158). **H. bullatus** Guignot (p. 498)
- Body more elongated, without any or with very indistinct colour pattern (Figs 1185, 1204); downwards bent penis apex longer (Fig. 1189) . . . . . 10
- 10. Big species (length 4.04-4.84 mm) . . . . . 11
- Smaller species (length 3.80-4.00 mm) . . . . . 12
- 11. Big species (length 4.36-4.84 mm); apical half of penis moderately bent downwards (Fig. 1189). **H. badeni** Sharp (p. 506)
- Smaller species (length 4.04-4.32 mm); apical half of penis strongly bent downwards (Fig. 1164). **H. wittei** n.sp. (p. 500)
- 12. Penis for a long distance almost parallel-sided (Fig. 1207); penis apex broader (Fig. 1208). **H. soror** n.sp. (p. 514)
- Sides of penis distinctly curved (Fig. 1195); penis apex narrow (Fig. 1195). **H. leonardi** Bil. & Ped. (p. 510)

For description of species, see pages 494.

### Species group 14 (sp.gr. *confertus*)

Length of body: 2.26–3.10 mm, breadth: 1.48–1.94 mm. Body dorsoventrally somewhat flattened, fairly globular to somewhat elongated. Body sometimes oval (Figs 1226, 1293, 1306). Unicoloured throughout species group.

Head: Frontal outline rounded, medially often straightened, sometimes outline slightly uneven. Margined, but margin more or less reduced, sometimes very indistinct (only rudiments discernible) (Figs 1244, 1301). In *H. sumatrensis* margin almost complete (Fig. 1307). Male antenna slender, unmodified or with modifications (enlarged segments arranged differently depending on which species) (Figs 1308, 1238, 1257). Palpi simple.

Ventral side: Generally provided with stridulatory apparatus or in two species with a glabrous area (regarded as a modification) at site of apparatus (one variation with a strongly rudimentary stridulation file). Two species with male totally lacking stridulatory apparatus or glabrous area (regarded as a probable loss of a once-possessed feature). Appearance of stridulatory apparatus variable: From about ten ridges to numerous minute ridges; rarely rudimentary.

Legs: Male protarsal claws simple.

Male genitalia: Penis with an apically finely hooked apex (Fig. 1240). Paramere apically hooked (Fig. 1241).

Fifteen species are recognized in this predominantly Oriental species group, but there are records from China.

A morphologically quite homogenous species group, which probably also is monophyletic. The appearance of the penis apex, deviating from other *Hydrovatus* species, may be a synapomorphous character supporting the monophyly.

#### Key to species (to be considered tentative)

*H. punctipennis* Motsch. is excluded from the key because only the female is known (p. 549).

1. Male ventrally without stridulatory apparatus or glabrous area . . . . . 2
- Male ventrally with stridulatory apparatus (rarely rudimentary) or glabrous area . . . . . 3
2. Small species (length 2.44–2.50 mm); body-shape quite globular (Fig. 1287); penis narrows unevenly to obtuse apex (Fig. 1290).
 

***H. jaechi* n.sp. (p. 543)**

- Bigger species (length 2.90–3.02 mm); body-shape elongated (Fig. 1293); penis narrows gradually to obtuse apex (Fig. 1296).
  - H. agathodaemon** n.sp. (p. 544)
- 3. Male antenna with segments 4–11 strongly enlarged (Fig. 1257).
  - H. samuelsoni** n.sp. (p. 533)
- Male antenna different, slender or less strongly enlarged (Figs 1228, 1283) . . . . . 4
- 4. Male at region of stridulatory apparatus with a distinct glabrous area (rarely with a rudimentary file) . . . . . 5
- Stridulatory apparatus consists of separate ridges . . . . . 6
- 5. Male antenna with segments 3–8 somewhat enlarged (Fig. 1283); body globular (Fig. 1281) (rarely with a rudimentary stridulation file).
  - H. enigmaticus** n.sp. (p. 541)
- Male antenna practically with non-enlarged segments (Fig. 1276); body somewhat elongated (Fig. 1274) (never with rudimentary file).
  - H. opacus** Sharp (p. 538)
- 6. Hook of penis apex projecting somewhat forewards (Fig. 1304).
  - H. grabowskyi** Rég. (p. 545)
- Hook of penis apex projects downwards (Fig. 1253) . . . . . 7
- 7. Male antenna slender, not modified (Figs 1228, 1270) . . . . . 8
- Male antenna with at least slightly enlarged segments (Figs 1245, 1264) . . . . . 10
- 8. Penis ventrally near apex with hairs (Fig. 1310).
  - H. sumatrensis** Sharp (p. 547)
- Penis ventrally near apex nude (Fig. 1272) . . . . . 9
- 9. Small species (length 2.40–2.68 mm); body fairly globular (Fig. 1226).
  - H. sinister** Sharp (p. 521)
- Larger species (length 3.06 mm); body somewhat elongated (Fig. 1268).
  - H. rangoonensis** Guignot (p. 537)
- 10. Body broad (Fig. 1262); male antenna almost unmodified (Fig. 1264).
  - H. pinguis** Rég. (p. 535)
- Body more elongated (Fig. 1249); male antenna with distinctly enlarged segments (Figs 1232, 1251) . . . . . 11
- 11. Male antenna with segments 5–11 almost equally broad (Fig. 1245).
  - H. stridulus** n.sp. (p. 529)
- Male antenna with differently arranged enlarged segments (Figs 1238, 1251) . . . . . 12
- 12. Male antenna broadest at segments 4–6 (Fig. 1251).
  - H. obtusus** Motsch. (p. 530)
- Male antenna broadest between segments 6–8 (Fig. 1238) . . . . . 13

13. Apex of penis almost straight (Fig. 1234); penis narrows quite abruptly towards apex (Fig. 1233); elytral punctuation fairly dense; outline of paramere apex rounded (Fig. 1235).

**H. confertus** Sharp (p. 524)

- Apex of penis curved (Fig. 1240); penis narrows quite evenly towards apex (Fig. 1239); elytral punctuation sparse: outline of paramere apex somewhat obtuse (Fig. 1241). **H. subtilis** Sharp (p. 526).

For description of species, see pages 521.

#### **Species group 15 (sp.gr. *clypealis*)**

Length of body: 2.30–2.64 mm, breadth: 1.46–1.66 mm. Body fairly globular, without colour pattern.

Head: Male head frontally slightly extended, medially almost straight, and from eye to eye margined (Fig. 1316). Female head with frontal outline rounded. Male antenna with segments three to ten quite short (Fig. 1317). Palpi simple.

Ventral side: Male provided with stridulatory apparatus, which consists of approximately 15 ridges.

Legs: Male protarsal claws simple.

Male genitalia: Penis with extended narrow apex (Fig. 1320). Paramere apically not distinctly hooked, provided with minute tubercles (Fig. 1323).

One species is recognized in this subgroup and it has a western palearctic distribution (*H. clypealis* Sharp).

A deviating species of *Hydrovatus*, which is provided with a stridulatory apparatus, but which lacks a distinctly hooked paramere. This combination is unique in *Hydrovatus*. Minute tubercles on paramere apex is probably an apomorphous character.

For description of species, see page 551.

#### **6.5. Descriptions of the species**

**Abbreviations used: m = male specimen, f = female specimen.**

##### **6.5.1. Species group 1 (sp.gr. *pictulus*)**

**Hydrovatus pictulus** Sharp

Figs 21-27, 42.

*Hydrovatus pictulus* Sharp, 1882a:323 (orig. descr.); BRANDEN, 1885:26 (faun.); SEVERIN, 1892:472 (list.); RÉGIMBART, 1895b:105 (descr., faun.); 1903:11 (faun.); ZIMMERMANN, 1920a:35 (faun., list.); GUIGNOT, 1959a:150, 157 (descr., faun.).