

**A SYNOPSIS OF THE GENUS *HYDRAENA* (COLEOPTERA: HYDRAENIDAE)
OF THE MIDDLE EAST**

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ABSTRACT

Hydraena berytus n. sp., *H. ortali* n. sp., *H. glassmani* n.sp. and *H. bromleyae* n. sp. are described. *Hydraena damascaena* Pic is redescribed and *H. paganetti* Ganglbauer is recorded for the first time in the Middle East. Three major phylogenetic lineages corresponding to three subgenera (*Hydraenopsis*, *Phothy-draena* and *Hydraena*) are recognized. The subgenus *Hydraena* s.str. comprises two species groups. Six of the 8 species recorded seem to be endemic in the Middle East.
KEY WORDS: Coleoptera, Hydraenidae, *Hydraena*, Middle East, Israel.

Until now only four species of *Hydraena* Kugelann (Coleoptera: Hydraenidae) have been recorded from the Middle East: *Hydraena damascaena* Pic from Syria (Pic, 1910), *Hydraena arabica* Balfour-Browne from Israel (Jach, 1982), *Hydraena furthi* Jach from Lebanon and Israel (Jach, 1982); *Hydraena grandis* Reitter was recorded by Ganglbauer (1904), but the specimens he referred to belong to a hitherto undescribed species. D'Orchymont (1940) reports of a *Hydraena* sp. (Coll. Bedel) found near Beirut, which he erroneously believed to be different from *Hydraena damascaena*. Dia (1983) in his unpublished thesis mentioned the occurrence of several species in southern Lebanon without giving names.

Recent surveys in Israel carried out by the author and the Inland Water Ecological Service (IES Laboratory) of the Nature Reserves Authority and the Hebrew University, Jerusalem revealed 4 additional species, 3 of which are new to science.

Abbreviations: ISNB - Institut royal des Sciences Naturelles de Belgique, Brussels; MHN — Museum d'Histoire Naturelle, Geneva; MNHN — Museum National d'Histoire Naturelle, Paris; NMW — Naturhistorisches Museum, Wien; TAU — Department of Zoology, Tel Aviv University.

Hydraena berytus n. sp.

Fig. 1

3.0 mm long. Similar to *grandis* and *subgrandis* Jäch, but pronotum and elytra wider, thus appearing shorter. Protibia slightly enlarged near distal end, with a well developed brush of short setae; mesotibia curved, without preapical enlargement; metatibial tooth globose and blunt, situated behind midlength.



Fig. 1-2. Aedeagus of (1) *Hydraena berytus* n. sp., (a) apex in ventral aspect, (b) penis and left paramere in lateral aspect, (c) right paramere and (2) *Hydraena glassmani* n. sp.

Aedeagus (Fig. 1): Proximal lobe ca. 400 micrometer long, apically widened, with a peculiar tooth-like projection on ventral side. Distal lobe bearing a short flagellum.

MATERIAL EXAMINED. Holotype ♂: Appl (= Collector) Beirut 1878/*Hydraena grandis* m (Reitter's handwriting)/*grandis* (Ganglbauer's handwriting); NMW. Paratype ♂: Appl Beirut 1878/*grandis*; NMW.

ETYMOLOGY. Berytus is the Latin name of Beirut.

Hydraena glassmani n. sp.

Fig. 2

2.4-2.6 mm long. Similar to *damascaena* and *bromleyae* n. sp., but tips of palpi usually distinctly (not vaguely) darkened, and body colour generally darker; pronotum and elytra longer; rows of elytral punctures denser and more regular; apices of elytra produced and moderately attenuate, only slightly arcuate to ventral surface, thus apical declivity not pronounced; metasternal plaques of ♀ wider than those of ♂, thus the pruinose groove narrower; inner side of hind tibia of male only slightly enlarged over middle.

Females of this species can immediately be distinguished from females of *damascaena* and *bromleyae* n. sp. by their wide metasternal plaques, narrow pronotum and long elytra, flattened apical declivity and by the last palpal segment which is usually distinctly darkened apically (only occasionally so in the two other species).

Aedeagus (Fig. 2): Proximal lobe ca. 470 micrometer long, widening towards distal end, with ca. 5-10 setae near apex. Distal lobe long, transparent, only weakly sclerotized; flagellum long and thin, its tip seems to be attached to the apex of the distal lobe. Right paramere strongly produced dorsally, with a coronet of long bristles along its edges. Left paramere distinctly longer than proximal lobe, evenly wide, with numerous setae along ventral edge and apex.

MATERIAL EXAMINED. Holotype ♂: Israel, 16.VIII.1985, Banyas leg. Jäch; NMW. Paratypes: 12 specimens from the same river as the holotype; 1 ex. Israel, Ein Jalabina; 15.VII.1985, Golan leg. Jäch; 2 ex. Israel, 15.VII.1985, ein a-Tina leg. Jäch; 4 ex. Israel, 1.VIII.1985, Syrian Canal I (= Ein el Bared) leg. Jäch; 1 ex. Israel, 31.VII.1985, Syrian Canal (= W. Nucheile); 4 ex. Israel, N. Dan, (IES sample); NMW, TAU.

ETYMOLOGY. Named for Hillel Glassman, Nature Reserve Warden, who has helped me to locate numerous suitable collecting sites in northern Israel.

DISTRIBUTION. Israel: Golan Heights (N. Gamla, Ein Jalabina, En Zvi, Ein a-Tina) and Hula Valley (N. Dan, N. Banyas, W. Nucheile).

Hydraena ortali n.sp.

Fig. 3

2.0-2.1 mm long. This new species is closely related to *Hydraena furthi*. It agrees with *furthi* in size and colour and the general shape of the body. It differs by the explanate margin of the elytra being more developed towards the apex. Thus elytral apices less attenuate and wider than in *furthi*.

Aedeagus (Fig. 3): Proximal lobe ca. 320 micrometer long, with one dorsal and 3 apical bristles. Distal lobe long and slender, gradually tapering towards its apex. Left paramere longer than right one (according to terminology used by Perkins, 1980).

Apices of both parameres covered with numerous setae. The aedeagus of *H. furthi* differs by its stronger and shorter distal lobe and by the isolated seta of the proximal lobe, which is situated further distal.



Fig. 3-4. Aedeagus of (3) *Hydraena ortalii* n. sp. and (4) *Hydraena arabica*, (a) apex in ventral aspect, (b) aedeagus in lateral aspect.

MATERIAL EXAMINED. Holotype ♂: Israel, 5.VIII.1985 N. Daliyya (= small stream on Mt. Carmel, Coordinates 1524/2217) leg. M. Jäch; NMW. Paratypes: 30 ex. from different stations along Nahal Daliyya, with the same label data as the holotype; 3 ex. Israel, N. Shelef (tributary of N. Daliyya) 5.VIII.1985; 31 ex. Israel, 7.IX.1985, Samaria: Ein e-Shallal; 19 ex. Israel, 21.III.1986, N. Taninim (upper course); 3 ex. Israel, N. Ada (tributary of N. Taninim) 21.III.1986; 1 ex. Israel, 21.III.1986 Quarry on Mt. Carmel (1526/2196). All specimens were collected by the author and are deposited in the NMW, TAU and ISNB.

DISTRIBUTION. *Hydraena ortali* must be considered a geographical vicariad of *Hydraena furthi*. It occurs only in Israel south of the Yizre'el Valley, which forms an important vicariance zone: Mt. Carmel (N. Daliyya, N. Shelef, N. Ada, N. Tananim, Ein Zini, En Tut), Samarian Mountains (Ein e-Shallal 1642/1656, Ein e-Jisr 1662/1616) and Judean Mountains (Ein Jala 1510/1142, Ein Abu Fayaar 1605/1593).

ETYMOLOGY. Named for my friend Reuven Ortal (Nature Reserve Authorities of Israel), Coordinator of the IES-Project.

Hydraena furthi Jäch, 1982

Hydraena furthi Jäch, 1982:59

DISTRIBUTION. Lebanon: Beirut. Israel: Hula Valley (N. Iyon, N. Dan, N. Hermon, N. Senir, W. Nuchile, N. Govta), Golan (Qusbiya, N. El-Al, N. Mezar, Ein Jalabina, N. Gamla, N. Yahudia, N. Daliyyot, W. Moisa) and Buteiha Valley (Majerasee, W. Aqeb).

Hydraena bromleyae n. sp.

Fig. 5

2.2-2.4 mm long. Dark brown to black, appendages light brown, tips of last palpal segment darkened.

Pronotum cordiform, sides margined and denticulate, disc slightly convex, with interstices between punctures shining.

Elytra with rows of punctures more or less distinct, explanate margin well developed but not very wide; apices bluntly rounded, truncate in males, slightly more produced in females.

Metasternal plaques thin, similar in both sexes.

Mesotibia of male slightly curved, weakly denticulate on inner surface near apex, hind tibia dilated past midlength.

Aedeagus (Fig. 5): Proximal lobe ca. 410 micrometer long, strong and stout, with a group of ca. 5-10 bristles on ventral side near apex and a group of micropores further distal on ventral side. Distal lobe hyaline to strongly sclerotized, with a very long flagellum. Right paramere short and wide, with numerous setae near apex. Left paramere longer than proximal lobe, its ventral margin and apex covered with setae.

MATERIAL EXAMINED. Holotype ♂: Israel, 2.VIII.1985, Banyas leg. Jäch; NMW. Paratypes: 1 ex. with label-data identical with those of holotype; 14 ex., Israel, 31.III.1985, Golan, N. Yahudiya leg. Jäch; 1 ex. Israel, 31.III.1985, Golan, N. Samakh, leg. Jäch; 1 ex. Israel, 31.III.1985, Golan, N. Meshushim, leg. Jäch; 6 ex. Israel, 15.VII.1985, Golan, Ein Jalabina, leg. Jäch; 2 ex., Israel, 16.VII.1985, Golan, En Brakha, leg. Jäch; 12 ex., Israel, 1.IV.1985, Golan, N. El-Al, leg. Jäch; 1 ex. Israel, 7.III.1986, Majerasee, leg. Jäch; 4 ex. Israel, Golan Mahjar; — 200 m 22.IV.1982 leg. Besuchet & Löbl; 1 ex. Israel, Golan, Kazabia (= Qusbiya) 15.IV.1982 leg. Besuchet & Löbl; NMW, MHN, TAU, ISNB and coll. Ferro.

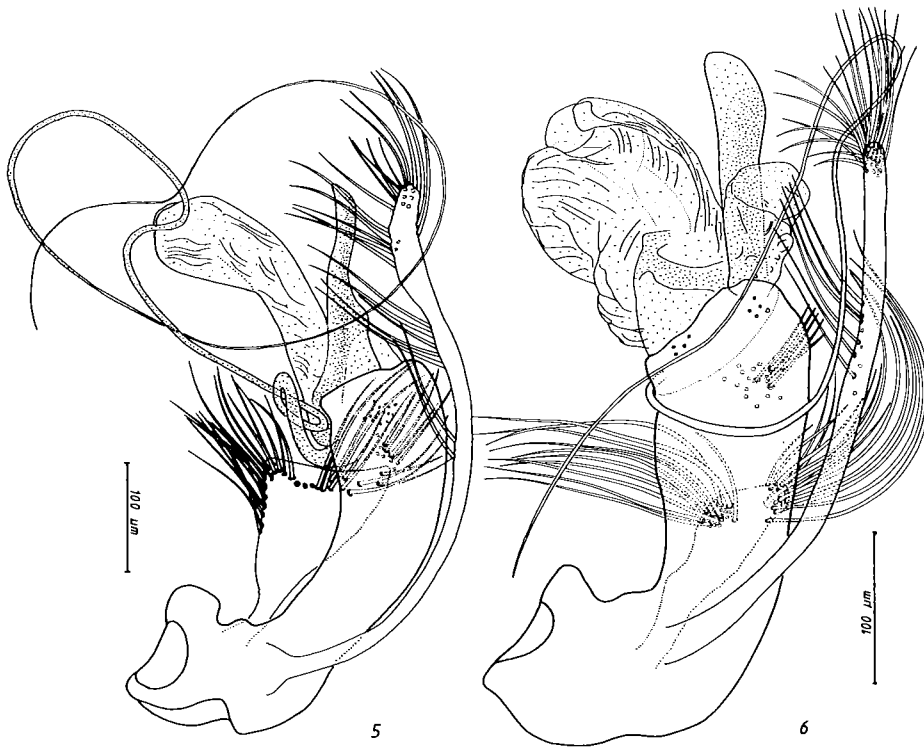


Fig. 5-6. Aedeagus of (5) *Hydraena bromleyae* n. sp. and (6) *Hydraena damascaena* Pic.

ETYMOLOGY. Named for Dr. Heather Joy Bromley-Schnur, IES collaborator, who helped to sort and to identify numerous Israeli waterbeetles.

DISTRIBUTION. Israel: Golan (N. Gamla, N. Daliyyot, N. Samakh, N. Meshushim, Ein Jalabina, N. El-Al, En Brakha, Qusbiya, N. Yahudiya), Buteiha Valley (Majerasee) and Hula Valley (W. Nucheila, N. Hermon, N. Tovim).

Hydraena damascaena Pic, 1910

Figs. 6, 7

Hydraena damascaena Pic, 1910:9

Described in 1910 from a single female collected near Damascus in Syria (Fig. 7). The specimen is deposited in the MNHN and labeled as follows: Damas/sp.nov.pr.numidica Dev./ damascaena PIC/ type. The collection of the ISNB contains 3 females collected by A. Ball from the Barada River near Damascus (see d'Orchymont 1940, p. 29). These three specimens match females I collected in Israel in every detail.

2.1-2.4 mm long. Very similar to *Hydraena bromleyae*, from which it can be distinguished by the following features: Pronotal disc usually less convex, interstices between punctures superficially microreticulate (this feeble reticulation is sometimes confined to the area near the anterior depression; disc always smooth and shining in

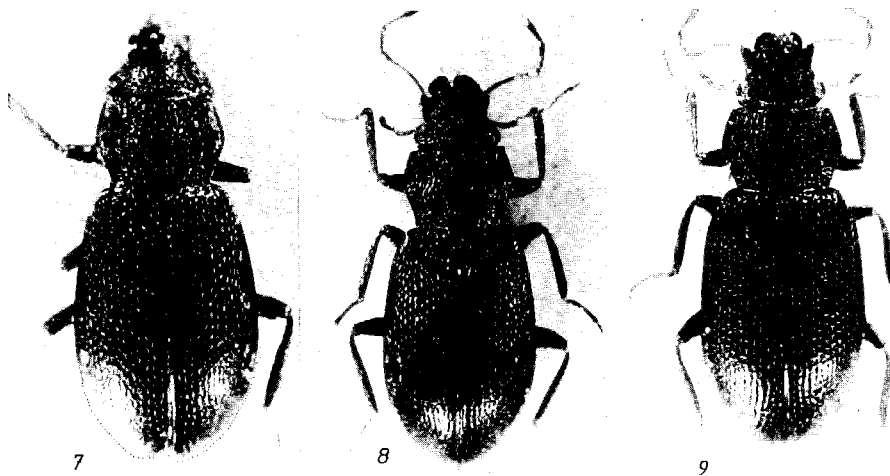


Fig. 7-9. Habitus of (7) *Hydraena damascaena* Holotype ♀, (8) *Hydraena damascaena* ♀ from Israel and (9) *Hydraena bromleyae* ♀.

bromleyae); sides of pronotum densely punctured and dull. Sides of elytra more rounded in apical third, apices usually slightly acuminate (in *bromleyae* elytra almost parallelsided, apices always truncate, Fig. 9). Metasternal plaques wider, thus pruinous groove narrower.

The faint pronotal microreticulation of *damascaena* usually serves as a reliable distinguishing feature. Elytral apices are somewhat variable in *damascaena*, but in most specimens they are slightly acuminate as in Figs. 7 and 8.

Tibial modifications of males more or less identical with those of *bromleyae*.

Aedeagus (Fig. 6): Proximal lobe ca. 330 micrometer long, less curved than in *bromleyae*. Flagellum of distal lobe shorter. Right paramere smaller and less spatulate, left paramere long and thin, not widening towards apex.

The holotype differs slightly from the average material by its small size (2.1 mm), by the not clearly pronounced pronotal microreticulation and by the flattened and oval-shaped elytra, which may be a result of previous squeezing.

DISTRIBUTION. Syria: Barada River near Damascus. Lebanon: Beirut. Israel: Upper Galilee: N. Ammud, N. Bezet, En Gorna (Upper N. Keziv) — En Tamir (Middle N. Keziv), En Aravot (Upper N. Dishon) and N. Halav (Upper N. Dishon); Hula Valley: N. Dan, N. Iyon, N. Govta; Mt. Hermon: N. Hazur; Golan: N. Mezar. *Hydraena damascaena* seems to prefer springs and streams flowing over sedimentary rock. In the Golan Heights it occurs only in Nahal Mezar, which is the only "limestone-stream" known in that area. I have never found *damascaena* and *bromleyae* together.

Hydraena paganettii Ganglbauer, 1901

Hydraena paganettii Ganglbauer, 1901:322

DISTRIBUTION Israel: Golan (N. Gamla, W. Moisa, N. Yahudiya, N. Samakh, N. Meshushim), Hula Valley (N. Senir, N. Hermon, W. Nucheila, N. Dan — at Dafna) and Mt. Hermon (En Nahal Nimrod).

Hydraena arabica Balfour-Browne, 1951

Fig. 4

Hydraena arabica Balfour-Browne, 1951:201

DISTRIBUTION. Israel: Golan (N. Gamla, W. Moisa, N. Yahudiya, N. Samakh, leg. R. Barkai). Israel: Dead Sea Area (N. Arugot, En Namer, En Abuv, B. Zefira).

ZOOGEOGRAPHY

Hydraena ortali is endemic to Israel. It is very unlikely that it occurs outside its presently known distribution area. *Hydraena damascaena*, *Hydraena berytus*, *Hydraena glassmani* and *Hydraena bromleyae* are probably confined to the Middle East. The distribution of *Hydraena bromleyae* seems to be correlated with the occurrence of basalt. *Hydraena paganettii* has a wide distribution: from Austria, southeastern Europe and Turkey to the Caucasus. Its eastern border of distribution is not yet know. *Hydraena arabica* is the only Eremian (?Ethiopian) element.

PHYLOGENETIC CONSIDERATIONS

The phylogeny of the Old World Hydraenidae is still not very well understood, simply because most species have not yet been described. This lack of knowledge makes evaluation of apotypic characters problematic because it is difficult to decide if such a character represents basic apotypy or just a simple morphocline.

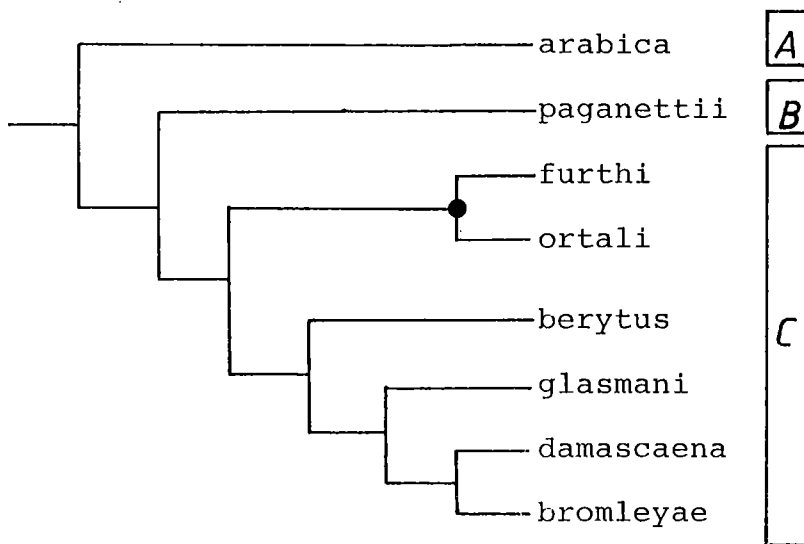


Fig. 10. Proposed phylogenetic relationships of *Hydraena* in the Middle East. χ = Pliocene. A = subg. *Hydraenopsis*, B = subg. *Phothydraena*, C = subg. *Hydraena* s.str.

The 8 species of the Middle East can be grouped in three major lineages which correspond to the three subgenera (Fig. 10). *Hydraena (Hydraenopsis) arabica* is clearly separated from all other Middle East species by a number of characteristics:

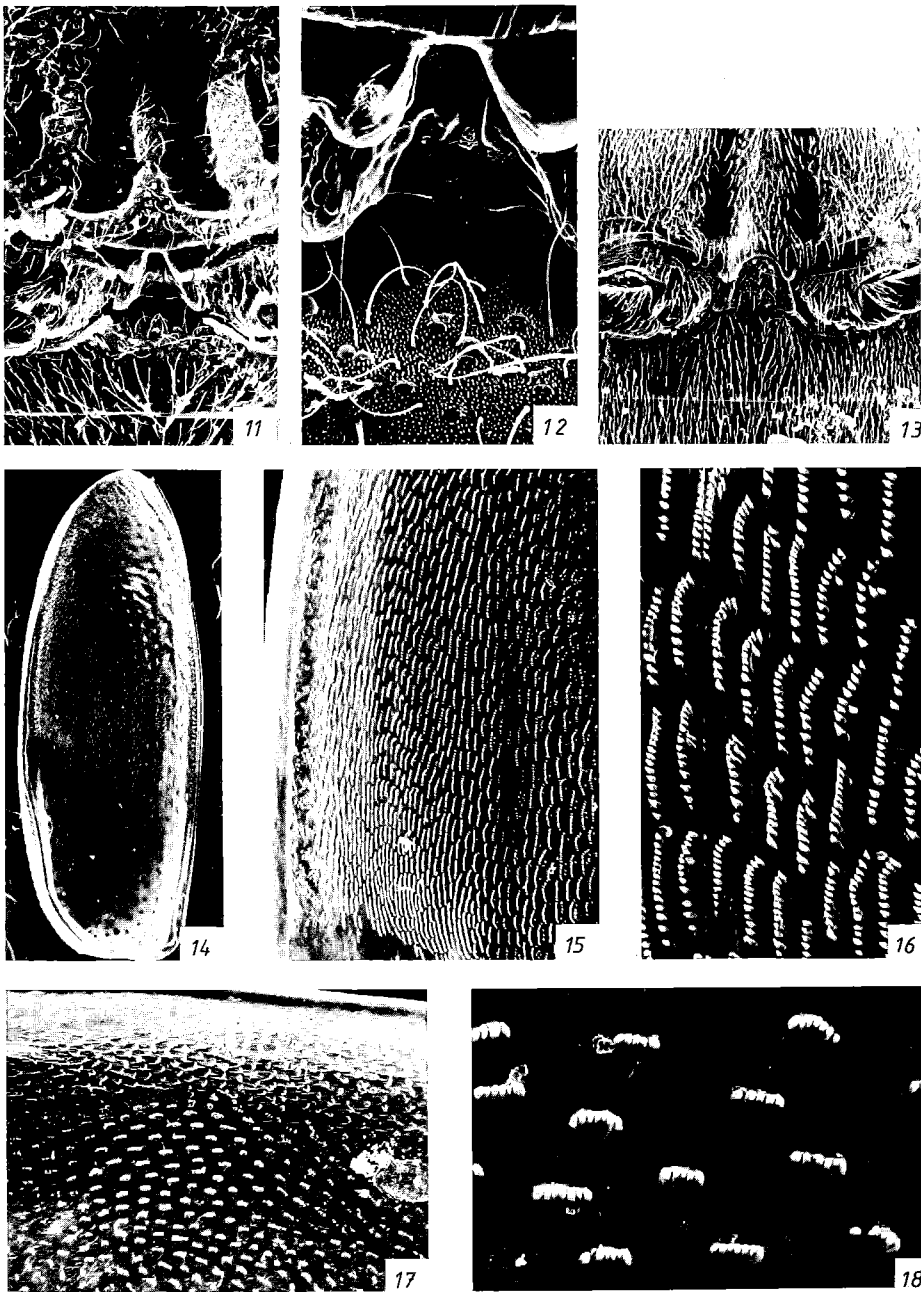


Fig. 11-18. SEM micrographs: (11) metasternum of *H. paganettii*, 155x, (12) intercoxal sternite of same, 555x, (13) metasternum and first abdominal segments of *H. arabica*, 59x, (14) inner surface of left elytron of *H. furthi*, showing stridulatory area, 59x, (15) same, detail, 235x, (16) same, detail, 1300x, (17) stridulatory area of elytron of *H. paganettii*, 235x, (18) same, detail, 1300x.

pronotum not markedly cordiform, sides rather parallelsided; intercoxal sternite with posterior angles not produced, thus hind margin straight; ventral surface without micropubescence; parameres greatly reduced, inserting near the apex; phallobasis quite simple.

Hydraena arabica shares these characters with a lot of other species from tropical regions (e.g. *H. vietnamensis* Janssens, type-species of *Hydraenopsis* Janssens). Thus I believe that *arabica* and its allies do form a monophyletic group which is quite difficult to define because most of the character states are plesiomorphic. *Hydraena arabica* is a relatively highly developed member of this group. The fact that I have not yet seen any *Hydraena* s.str. from tropical parts of Africa or Asia leads me to the assumption that its origin dates back to Laurasian times; the origin of *Hydraenopsis* in turn could be Gondwanan.

Hydraena (Phothydraena) paganettii differs from *Hydraena* s.str. by the following characters: large elytral punctures; sides of elytra denticulate; parameres symmetrical, inserting on ventral side of aedeagus; stridulatory area on inner surface of elytra less developed; the presence of a second pair of metasternal plaques (Fig. 11) is probably a synapotypy of this subgenus.

The remaining species belong to 2 phylogenetic groups: *Hydraena furthi* and *H. ortali* with typical setal homology of aedeagus and symmetrical phallobasis undoubtedly belong to the *riparia* species-group. They have probably been separated since the Pliocene. *Hydraena berytus*, *H. glassmani*, *H. damascaena* and *H. bromleyae* form part of the very inhomogeneous *grandis* species-group. All 4 species possess a highly asymmetric phallobasis, a small group of preapical aedeagal bristles and an aedeagal flagellum, which is rather short in *H. berytus*.

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