

Gyraulus huwaizahensis n. sp. – a new species from Mesopotamia, Iraq (Mollusca: Gastropoda: Planorbidae)

PETER GLÖER¹ & MURTADA D. NASER²

¹ Schulstraße 3, D-25491 Hetlingen, Germany
gloeer@malaco.de

² Department of Marine biology, Marine Science Center, University of Basra, Iraq
bio_mur_n@yahoo.com

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> Abstract

We continued our recent malacological investigations in Mesopotamia in order to increase our knowledge on the malacological fauna of this region. In the course of this we found a *Gyraulus* sp. that was hitherto unknown, *Gyraulus huwaizahensis* n. sp. To investigate if this is a new species in fact, we referred especially to the comprehensive paper of MEIER-BROOK (1983) as well as type material of other *Gyraulus* species that live in this region.

> Kurzfassung

Gyraulus huwaizahensis n. sp. – eine neue Art aus Mesopotamien, Irak (Mollusca: Gastropoda: Planorbidae). – Wir haben unsere derzeitigen malakologischen Untersuchungen in Mesopotamien fortgesetzt, um die Kenntnisse zur Molluskenfauna der Region zu erweitern. Hierbei fanden wir einen *Gyraulus* sp., der bisher unbekannt war, *Gyraulus huwaizahensis* n. sp. Um zu prüfen, ob dieser tatsächlich eine neue Art darstellt, haben wir besonders die umfassende Arbeit von MEIER-BROOK (1983) berücksichtigt, wie auch Typusmaterial anderer *Gyraulus*-Arten, die in der Region leben.

> Key words

Gyraulus, *Gyraulus huwaizahensis* n. sp., Mesopotamia.

Introduction

In former times the important studies of ANNANDALE (1918, 1920) contained records of *Gyraulus euphraticus* (Mousson, 1874) as well as *G. convexiusculus* (Hutton, 1849). ANNANDALE & PRASHAD (1919: 54) mentioned *G. convexiusculus* as a widely distributed and common species with a geographical range from Lower Mesopotamia through Eastern Persia, Afghanistan and Northern India to Upper Burma, French Indo-China, China, and the Malay Archipelago, and this species has been listed by AHMED, M. M. (1975: 28, fig 31) for Iraq, BROWN & WRIGHT (1980: 349, and fig. 2e–f) for Saudi Arabia as well as by NEUBERT (1998: 357) for the Arabian Peninsula. More recent papers mention in addition *Gyraulus ehrenbergi* (Beck, 1837) (NAJIM 1959: 160) from Iraq and *Gyraulus iraqensis* Pallary (HARRIS 1965: 526), however, the latter species' name does not exist. According to the paper by

MEIER-BROOK (1983: 51–52) *G. hebraicus* (Bourguignat, 1852) and *G. piscinarum* (Bourguignat, 1852) are distributed over a range from Syria and from Lebanon, respectively, to Turkey, so these species are possibly distributed in Mesopotamia, too.

Recent papers like the one by PLAZIAT & YOUNIS (2005) are, however, not helpful either, because they use species names like *Gyraulus albus* (O. F. Müller, 1774), a species not distributed in Iraq, as well as *Gyraulus intermixtus* (Mousson, 1874), which belongs to the genus *Planorbis* (see MEIER-BROOK 1976).

It is in fact not known which *Gyraulus* species are recently living in Iraq. The purpose of this paper is to provide a contribution to the knowledge on the genus *Gyraulus* in Iraq and to describe the new species *Gyraulus huwaizahensis*.



Fig. 1. The sampling site of *Gyraulus huwaizahensis* n. sp.

Material and methods

The snails were collected with a sieve, and the samples were put into 75% ethanol. The dissections and measurements of the genital organs and the shells were carried out using a Zeiss stereo microscope with an eyepiece-micrometer; the photographs were made with a Leica R8 camera system with a digital adapter. The type material is stored in the Zoological Museum of Hamburg (ZMH).

The sampling area

The marshes lie in the delta of the Tigris and Euphrates rivers (fig. 1) and extend over an area of more than 1500 km² (THESIGER 1964). The eastern and central marshes draw their water from the Tigris (Al-Huwaizah marshes and central marshes, respectively). The western marsh, Al-Hammar marshes, get their water through numerous canals from the Euphrates and eventually discharges into the Shatt Al-Arab.

Results

To determine the *Gyraulus* sp. collected by MURTADA D. NASER we had to compare the species with the presently known *Gyraulus* spp. of this region. Thus we had to examine type material of these species, and because syntypes of *G. convexiusculus* were not available, we used the material of MEIER-BROOK's collection, which contains some lots from different countries.

The species name *Gyraulus iraqensis* Pallary, which was used by HARRIS (1964: 526), could not be found in the papers of Pallary. The only species name *iraqensis* Pallary, 1939, belongs to the genus *Bithynia* (PALLARY 1939: 76). This paper has been cited by HARRIS (1964: 526), and *Gyraulus piscinarum* listed by PALLARY (1939: 73) is missing in HARRIS's species-list, so we believe it came in erroneously.

Genus *Gyraulus* Charpentier, 1837

Typusart: *Planorbis albus* O. F. Müller, 1774

Remark: *Gyraulus* species are left coiled but the under side is the functional upper side of the snail. In the following description we refer to the functional sides.

Gyraulus ehrenbergi (Beck, 1837)

Planorbis ehrenbergi Beck, 1837; loc. typ.: Alexandria, Egypt (topotype: Fig. 2)

Description: The 3.5 convex whorls strongly increase with a deep suture. The shell is glossy to silky with a slightly angled periphery, underside concave, and first whorl on both sides deep umbilicate. The surface of the shell is smooth with fine growth lines. Measurements: Diameter = 4.5 mm, height of last whorl = 1.0 mm.

Penis sheath longer than praeputium, bursa elongate club type, prostate gland with 14–19 long diverticles.

G. ehrenbergi is an African species, which has no close affinity to the western Asiatic species (MEIER-BROOK 1983: 53). Regarding BROWN (1994: 186) as well as VAN DAMME (1984: 37) it is endemic for the Lower Nile.

Gyraulus hebraicus (Bourguignat, 1852)

Planorbis hebraicus Bourguignat, 1852; loc. typ. Bahr-el-Houlé (Syrie) (paralectotype fig. 5.3)

Description: The 4 rather flat whorls strongly increase. The shell is glossy with a slightly angled periphery, both sides slightly concave. The surface of the shell is smooth with fine growth lines. Measurements: Diameter = 4–5 mm, height of last whorl = 1.2 mm.

Penis sheath longer than praeputium, bursa of club type, prostate gland with 11–15 diverticles (MEIER-BROOK 1983: 52).

Remark: According to MEIER-BROOK (1983: 52) the anatomy of *G. hebraicus* studied by him, is equal to *G. euphraticus*, thus it is possible that "euphraticus [is] a junior synonym of *G. hebraicus*".

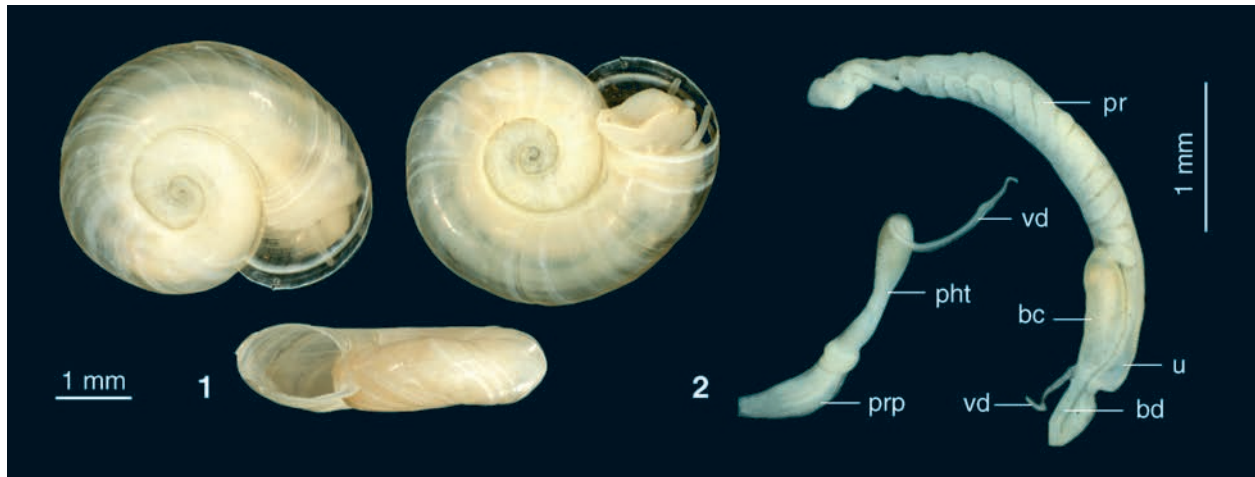


Fig. 2. *Gyraulus ehrenbergi* (topotype) (coll. Meier-Brook). 1: shell; 2: copulatory organs; bc = bursa copulatrix, bd = bursa duct, pht = phallosome, pr = prostata, prp = praepodium, u = uterus, vd = vas deferens.



Fig. 3. *Gyraulus euphraticus*, Paralectotype (“*Gyraulus*”-like type).

Gyraulus piscinarum
(Bourguignat, 1852)

Planorbis piscinarum Bourguignat, 1852; loc. typ.: Baalbeck (Lebanon) (topotype fig. 5.2)

Description: The 3.5 convex whorls increase strongly and regularly. The slightly transparent shell is glossy corneous with a rounded periphery, under side deep and widely umbilicated. The surface of the shell is smooth with fine growth lines. The upper side of the whorls, especially the body whorl, are slightly ribbed. Measurements: Diameter = 4.1–4.4 mm, height of last whorl = 1.0–1.2 mm (GLÖER & BÖSSNECK 2007).

Ratio of penis sheath : praepodium is variable, bursa of spherical tadpole type with a long duct, prostate gland short with 12–16 long diverticles (GLÖER & BÖSSNECK 2007).

Gyraulus euphraticus (Mousson, 1874)

Planorbis devians Porro var. *euphratica* (Mousson, 1874); loc. typ.: Samava, Euphrates (paralectotype figs. 3, 5.1)

Description: The 4.5 slightly convex whorls increase regularly. The shell is glossy with an angled periphery and looks similar to *Anisus*. The surface of the shell is smooth with fine growth lines. Measurements [mm]: Diameter = 6–7 mm, height of last whorl = 1.0 mm.

Penis sheath longer than praepodium, bursa spherical club type, prostate gland long with 9–18 diverticles (MEIER-BROOK 1983: 49).

Remark: Regarding MEIER-BROOK (1983: 48) the original lots contain shells of extreme conchological variation with transitional shell forms (fig. 3).

Gyraulus convexiusculus
(Hutton, 1849)

Planorbis convexiusculus Hutton, 1849; loc. typ.: Candahar (Afghanistan) (fig. 4)

Description: The 3.5–3.75 convex whorls increase strongly. The shell is glossy with a rounded to angulated (only last whorl) periphery. The surface of the shell is smooth with fine growth lines. Upper side deeply umbilicated, under side is slightly convex. Measurements: Diameter = 4–5 mm, height of last whorl = 1.0 mm.

Penis sheath longer than praepodium, bursa of elongate club type, prostate gland short with 10–15 diverticles (MEIER-BROOK 1983: 49).

Remark: *G. convexiusculus* has already been studied by Baker (1945: 275, pl. 19, fig. 1–3) who depicted the anatomy of *G. convexiusculus* from Calcutta, which corresponds to the results of MEIER-BROOK (1983: 56).

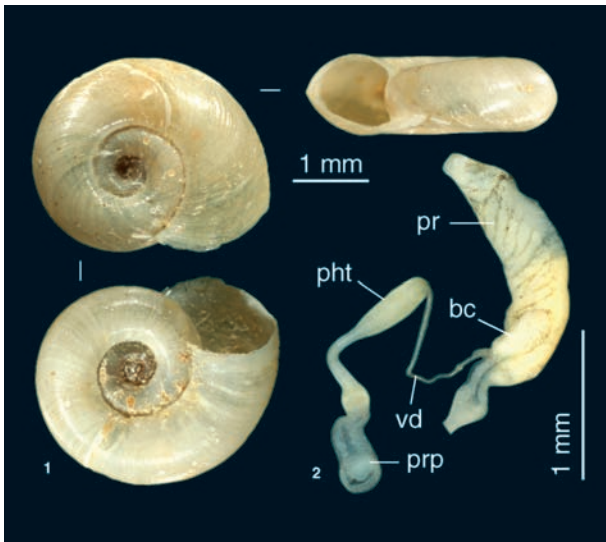


Fig. 4. *Gyraulus convexiusculus*, Hongkong (coll. Meier-Brook). 1: shell; 2: copulatory organs; bc = bursa copulatrix, pht = phalotheca, pr = prostata, prp = praeputium, vd = vas deferens.

Gyraulus huwaizahensis n. sp.

Material examined: 15 ex. from loc. typ.

Holotype: Shell height 1.0 mm, diameter 3.5 mm, ZMH 51056.

Paratypes: 2 ex., ZMH 51057, the rest is in the collection of Peter Glöer or are destroyed by dissections.

Locus typicus: Al-Huwaizah Marshes (31.3412 °N, 47.3011 °E) near Al-Amarah city.

Habitat: *Gyraulus huwaizahensis* n. sp. lives on submerged aquatic plants (*Ceratophyllum demersum*) syntopically with *Bithynia* sp., *Radix* spp. and *Phyllisella acuta*.

Etymology: Named after the region Al-Huwaizah Marshes, where the species lives.

Description: The light to light-corneous shell is glossy and transparent with fine growth lines. Three and three quarter regular convex whorls with a clear suture increase very rapidly from 2nd to 3rd whorl with a ratio of 0.29. The periphery is rounded in juveniles, angled in the adults with a small periostracal fringe. The last whorl is not deflected. Both sides of the shell are slightly convex. The shell is small to medium-size, 3.0–3.5 mm in diameter and 1.0 mm in height.

Animal: The animal is light grey with one row of distinct small black spots (fig. 6.2). The phalotheca is shorter or as long as the praeputium (fig. 6.3) with a swelling at the distal end of penis sheath. Bursa spherical tadpole type with a long duct, the prostate gland bears 9 long and fleshy diverticula. Some of the dissected specimens have been infected, thus neither a prostate gland nor a bursa copulatrix could be found in these.

Differential diagnosis: Concerning the shells, *Gyraulus euphraticus* and *G. hebraicus* are larger than *G.*

huwaizahensis, and their shells are growing regularly. The prostate diverticula in *G. euphraticus* as well as in *G. hebraicus* are shorter and not flushy as in *G. huwaizahensis*. The under side of *G. hebraicus* is deeply umbilicated, while that of *G. huwaizahensis* is not, and *G. hebraicus* appears in contrast to *G. huwaizahensis* like an *Anisus*.

The shell of *G. piscinarum* has a rounded periphery, the pigmentation of the mantle is diffuse, the prostate gland bears more diverticula than *G. huwaizahensis*. The whorls of *G. convexiusculus* increase rapidly in a regular way, the prostate gland bears narrow diverticula, the bursa is of elongate club type, in contrast to *G. huwaizahensis*.

G. ehrenbergi is a larger species with a diameter of 4.5 mm, almost lacking any pigment, the praeputium is much smaller than the phalotheca (pht : prp = 1.9), the prostate is longer, the bursa shape is distinct, and it is an endemic species to the Lower Nile.

Discussion

The Balkans as well as the Near East is a hot spot of evolution. There live some *Gyraulus* spp. which are widely distributed like *G. piscinarum* or *G. convexiusculus*, on the other hand many species are endemic like *G. ehrenbergi* or *Gyraulus* spp. in ancient lakes of the Balkans. So it is not surprising to find a new *Gyraulus* species in Mesopotamia.

With reference to MEIER-BROOK (1983: 48) there exists a conchological variation in *Gyraulus euphraticus*, but the two extreme shell forms depicted by him are possibly of two distinct species (fig. 3, 5.1) because they can be separated into two groups, the “*Anisus*”-like type and the “*Gyraulus*”-like type (fig. 7). It is not at all unusual to find two *Gyraulus* spp. living syntopically, e.g. in Central Europe the widely distributed and ubiquitous species *G. albus/G. crista* or in Montenegro two distinct endemic *Gyraulus* spp. which exist in Šasko Lake (GLÖER & PEŠIĆ 2007) syntopically.

It is unknown, which species have been depicted by ANNANDALE & PRASHAD (1919: 53, fig. 7 A+B). Considering the displayed scale, *G. euphraticus* sensu ANNANDALE & PRASHAD (1919: 53, fig. 7A) has a diameter of ca. 10 mm and *G. convexiusculus* sensu ANNANDALE & PRASHAD (1919: 53, fig. 7B) a diameter of ca. 9 mm. None of the *Gyraulus* spp. discussed here are of this size, and MEIER-BROOK (1983: 55) raises the question “whether Annandale & Prasad examined *Planorbis nanus* Sowerby”. If we assume that the scale displayed in the figure is wrong due to a misprint and we take only shells’ shape into consideration, ANNANDALE & PRASHAD’s fig. 7B could show *G. convexiusculus*, and

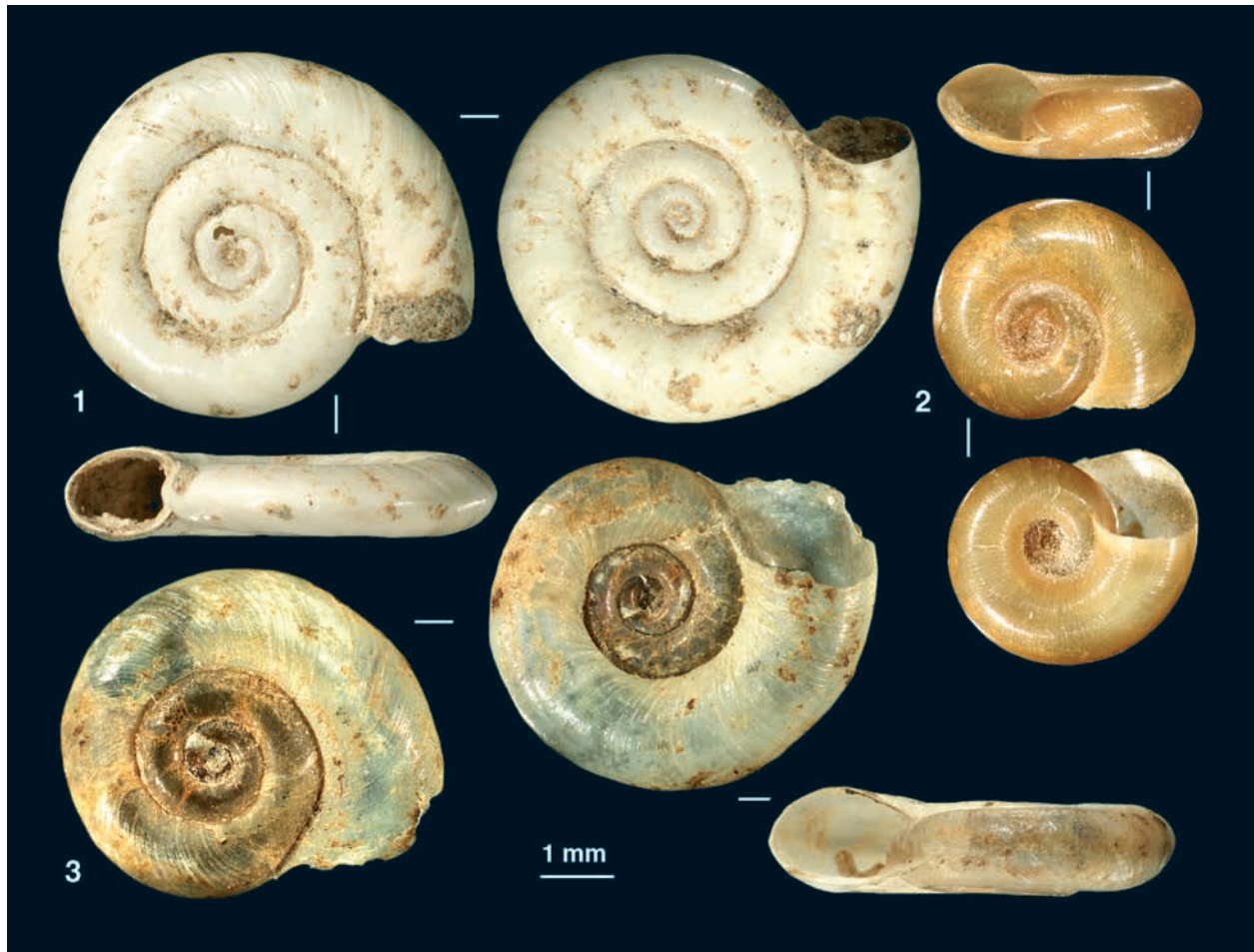


Fig. 5. 1: *G. euphraticus* (paralectotype) “*Anisus*”-like type, 2: *G. piscinarum* (topotype), 3: *G. hebraicus* (paralectotype).



Fig. 6. *Gyraulus huwaizahensis* n. sp. 1: shell, 2: pigmentation, 3: copulatory organs; bc = bursa copulatrix, m = muscle, pht = phallotheca, pr = prostata, prp = praeputium, vd = vas deferens.

under the assumption that *G. huwaizahensis* n. sp. examined by us are aberrant specimens, the new species could be in ANNANDALE & PRASHAD's fig. 7A. Thus this species cannot be *G. euphraticus* because of the

distinct anatomy. However, in every case *G. huwaizahensis* is a new species in fact.

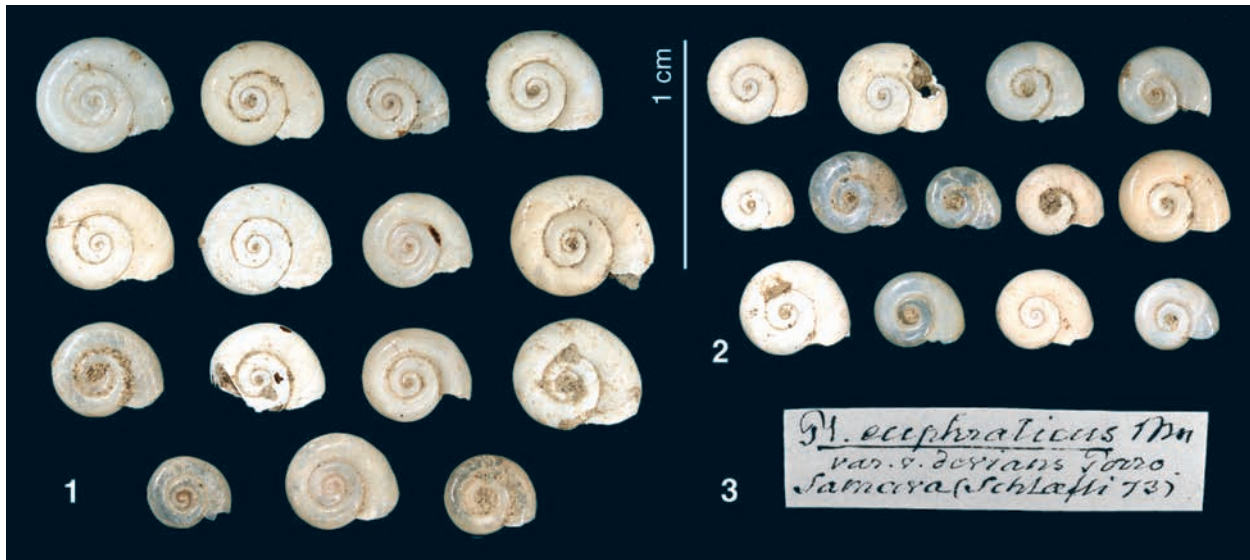


Fig. 7. *Gyraulus euphraticus* (paralectotypes), 1: “Anisus”-like type, 2: “Gyraulus”-like type, 3: original label (1.5x).

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References

- AHMED, M. M. (1975): Systematic study on Mollusca from the Arabian Gulf and Shatt al-Arab, Iraq. – Center for Arab Gulf Studies University Barash: 1–78.
- ANNANDALE, N. (1920): Report on the freshwater gastropod Molluscs of Lower Mesopotamia. Part II. The Family Planorbidae. – Records of the Indian Museum, **18**(3): 147–148.
- ANNANDALE, N. & PRASHAD, B. (1919): The Mollusca of the inland waters of Baluchistan and of Seistan. – Records of the Indian Museum, **18**: 17–63, pl. 3–8.
- ANNANDALE, N. (1918): Freshwater shells from Mesopotamia. – Records of the Indian Museum **15**: 159–170.
- BAKER, F.C. (1945): The molluscan family Planorbidae. The University of Illinois Press. xxxvi + 530 pp., pl. 1–141.
- BROWN, D. (1994): Freshwater snails of Africa and their medical importance. 2nd edition. 609 pp.
- BROWN, D. S. & WRIGHT, C.A. (1980): Freshwater Molluscs. – In: WITTMER, W. & BÜTTIKER, W. (eds.): Fauna of Saudi Arabia **2**: 341–357.
- DAMME, D. VAN (1984): The freshwater Mollusca of Northern Africa. Distribution, Biogeography and Palaeoecology. 164 pp.
- KÜSTER, H. C., DUNKER, W. & CLESSIN, S. (1841–1886): Die Familie der Limnaeiden enthaltend die Genera *Planorbis*, *Limnaeus*, *Physa* und *Amphipeplea*. – Systematisches Conchylien-Cabinet (Ed. 2), **17**: Tit.+430 pp., 55 Taf.
- GERMAIN, L. (1921–1923): Catalogue of the Planorbidae in the Indian Museum. – Records of the Indian Museum, **21**: 81–210, pl. 1–4.
- GLÖER, P. & BÖSSNECK, U. (2007): Zur Identität von *Gyraulus piscinarum* Bourguignat, 1852 mit der Beschreibung von *G. bekaensis* n. sp. (Gastropoda: Planorbidae). – Mollusca **25**(2): 139–146.
- GLÖER, P. & PEŠIĆ, V. (2007): *Gyraulus meierbrooki*, *G. ioanis*, and *G. shasi* – three new *Gyraulus* spp. from the Skadar Lake Basin, Montenegro (Gastropoda: Planorbidae). – Mollusca **25**(2): 131–137.
- HARRIS, S. A. (1965): Ecology of the freshwater mollusca of Iraq. – Canadian Journal of Zoology **43**: 509–526.
- MEIER-BROOK, C. (1976): The generic position of *Planorbis* (*Gyraulus*) *intermixtus* Mousson, 1874, and *Planorbis presbensis* Sturany, 1894 (Gastropoda, Basommatophora). – Basteria, **40**: 107–118.
- MEIER-BROOK, C. (1983): Taxonomic studies on *Gyraulus* (Gastropoda: Planorbidae). – Malacologia **24**(1–2): 1–113.
- NAJIM, A. T. (1959). Notes on the distribution of some molluscs in Iraq. – Proceedings of the Malacological Society of London **33**: 159–163.
- NEUBERT, E. (1998): Annotated checklist of the terrestrial and freshwater molluscs of the Arabian Peninsula with descriptions of new species. – Fauna of Arabia **17**: 333–461.
- PLAZIAT, J.-C. & YOUNIS, W. R. (2005). The modern environments of mollusca in southern Mesopotamia, Iraq: A guide to paleogeographical reconstructions of Quaternary fluvial, palustrine and marine deposits. – Carnets de Geologie (2005/01): 1–18.
- SUBBA RAO, N. V. (1989): Handbook freshwater molluscs of India. – Zoological Survey of India. 289 pp.
- THESIGER, W. (1964): The Marsh Arabs. Butler and Tanner, London 241 pp.