Two new valvatoid genera (Gastropoda, Hydrobiidae) from Morocco

PETER GLÖER¹, YOUNESS MABROUKI² & ABDELKHALEQ FOUZI TAYBI³

¹ Schulstr. 3, D-25491 Hetlingen, Germany. E-mail: gloeer@malaco.de
² Université Sidi Mohamed Ben Abdellah, Faculté des Sciences de Dhar El Mehraz, Laboratoire de Biotechnologie, Conservation et Valorisation des Ressources Naturelles, Fes/ Moroccan wildlife Photographers, Cultural center Menara, Gueliz Marrakech, Morocco. E-mail: younes_mab@hotmail.fr
³ Université Sidi Mohamed Ben Abdellah, Faculté des Sciences de Dhar El Mehraz, Laboratoire de Biotechnologie, Conservation et Valorisation des Ressources Naturelles, Fes, Morocco. E-mail: taybiaf@gmail.com

Received 30 March 2020 │ Accepted by V. Pešić: 19 April 2020 │ Published online 23 April 2020.

Abstract
Recent field surveys conducted on the Middle Atlas of Morocco have led to the discovery of two new species belonging to two new genera (Ifrania n. gen. and Fessia n. gen.) described here. Photos of the holotypes are presented in addition to the penis morphology of the new genera, the map of the sampling area with the type localities and the habitat description. Ongoing investigations will possibly reveal more new genera and species from the country.

Key words: Morocco, Gastropoda, Hydrobiidae, new genera.

Introduction
Moroccan Hydrobiidae fauna is not well studied and research on hydrobiids in Morocco is still in its infancy. It is represented by the following few genera: Hydrobia Hartmann, 1821, Ecrobia Stimpson, 1865, Peringia Paladilhe, 1874, Heideella Backhuys & Boeters, 1974, Atebbania Ghamizi, Bodon & Giusti 1999, Iglica Wagner 1927, Mercuria Boeters, 1971, Pseudamnicola Paulucci 1878, the recently described Aghbalia Glöer, Mabrouki & Taybi, 2020 and Islamia Radoman, 1973. This latter, represented by I. tifertiensis Glöer, Mabrouki & Taybi, 2020, is the only formally described valvatoid species and genus from Morocco until now (Glöer et al. 2020). Other hydrobiids genera were reported as nomina nuda in the PhD dissertation of Ghamizi 1998, this publication does not meet the criteria as a valid publication for International Code of Zoological Nomenclature (Van Damme et al. 2010).

From the SW-Mediterranean some valvatoid genera are known: Islamia Radoman 1973, Arganiella Giusti & Pezzoli 1980, and Boetersiella Arconada & Ramos 2001. In the Hydrobiidae the penis is characteristic for the genera in combination with shells morphology (Bodon et al. 2001; Szarowska 2006).

While Islamia has a penis which is bilobed (Radoman 1983), the others have a simple penis. The penis of Boetersiella has a bulbous at the basis of the short penis (Arconada & Ramos 2001), while the penis of Arganiella has not (Giusti & Pezzoli 1980).
The shells of *Islamia* and *Arganiella* are wide umbilicated, *Boetersiella* is not. In addition *Arganiella* is an unpigmented subterranean species which lacks eye-spots (Boeters et al. 2014).

This paper is intended to describe two new valvatoid genera which are different from other genera of the region.

### Material and methods

#### Sampling

Field surveys were conducted from November 2019 (ongoing), in which different localities were prospected along the Middle Atlas hydrosystems. Our goal was to document maximum macroinvertebrate biodiversity in the different microhabitats prospected at each sampling site. The samples of benthic fauna (including mollusks) were collected by a kick net, hand or with a tweezers. The samples have been fixed in 75% ethanol.

The dissections and measurements of the genital organs and the shells were carried out using a stereo microscope (ZEISS); the photographs were made with a digital camera system (Leica R8). The type material is stored in the Zoological Museum of Hamburg (ZMH).

#### Study Area

The Middle Atlas (Figure 1) is a mountain range stretched over 350 km, from southwest to northeast of Morocco, located between the Rif and the High Atlas, and covering a total area of 2.3 million hectares, or 18% of the altimontain domain of Morocco and is of great hydrogeological interest. Indeed, of all the Moroccan mountains, the Middle Atlas is the most important water reservoir of the country and it reveals a great diversity of habitats of wetlands, ranging from natural and artificial lakes, to cold rivers and springs (Chillasse & Dakki 2004). The Middle Atlas occupies a privileged place among the Moroccan regions of major interest for the conservation of the wetlands biodiversity, knowing that it host more than a quarter of the country's endemic aquatic fauna (Dakki 1997). However, most of these wetlands are suffering from several anthropic disturbances, which are amplified by repetitive droughts and global changing, as it is the case for all the Moroccan territory and North Africa (Mabrouki et al. 2017, 2019; Taybi et al. 2020).

![Figure 1. Location of the Middle Atlas of Morocco with marked type localities of new species of this study.](image-url)
Results

Family Hydrobiidae Troschel, 1857

Ifrania n. gen.
https://zoobank.org/urn:lsid:zoobank.org:act:4C167B16-C92A-4439-AE88-44E8E3288E6E
Type species: Ifrania zerroukansis n. sp.

Description: The tiny shell is valvatoid with a wide umbilicus. The cylindric penis is very long and thin with a pointed penis tip. The basis is broadened.

Differential Diagnosis: From Islamia the species can be distinguished by the penis, which is in Islamia bilobed.

Etymology: named after the province of Ifran where the species has been collected.

Ifrania zerroukansis n. sp. (fig. 2)

Material studied: Holotype: 1.1 mm high, 1.5 mm broad, ZMH 140694; paratypes: 3 ZMH 140695, 3 in coll. Mabrouki, 3 in coll. Glöer.

Type locality: Morocco, Zerrouka, Ifran province, 33°32'35.7"N 5°05'42.7"W, 14.02.2020 leg.

Etymology: Named after the type locality.

Habitat: Zerrouka is a rheocenous natural spring, partially modified, located at Ifran province at an altitude of 1613 m above sea level. The grain size of the bottom consists of stones, pebbles sand and sometimes silt and plant debris. The spring water feeds the Zerrouka lake, a small artificial fish pond classified as a site of biological and ecological interest (SIBE). It is located on the Zerrouka River, the main tributary of the Tizguite wadi. The dam is located about 300m from the source, so that the water from the spring flows directly in it. The reservoir is limited by a concrete wall, at least on the west bank. The aquatic and riparian vegetation at lake level is quite varied. The spring waters are used to supply the town of Ifrane with drinking water. The banks are subjected to a strong anthropic pressure, mainly by trampling cattle.

Figure 2. Shell and penis of Ifrania zerroukansis n. gen. n. sp. 1: holotype, frontal view, 2: penis, 3: holotype, umbilical view, 4: holotype, apical view, 5: paratype, frontal view.
**Description**

*Shell*: The valvatoid shell has a very small spire. The body whorls is very prominent and the last whorl is descended. The first whorls are slightly convex with a clear suture. The aperture is nearly circular and the umbilicus is wide not covered by the last whorl. The outer line of the aperture is straight from lateral view. The peristome is sharp. The shell is 1.1 mm high and 1.5 mm in diameter.

*Penis*: The cylindric penis is long and slender, widened at the basis and tapered at the distal end with a pointed penis tip.

*Operculum*: The circular to ovate operculum is slightly concave, yellowish with an orange nucleus, and flat at the nucleus.

**Distribution**: Morocco, only known from the type locality.

**Associated species**: Physa acuta, Gyraulus sp.

**Fessia** n. gen.
https://zoobank.org/urn:lsid:zoobank.org:act:552DBF7B-FCB1-48F8-934B-B5D5704D913E

Type species: *Fessia aouintii* n. sp.

**Description.** *Shell*: The tiny shell is valvatoid, thin and translucent, the umbilicus is wide. The penis is flat, relatively thick at the basis with a small bulge and tapered at the distal end.

**Differential Diagnosis:** From *Islamia* the new genus can be distinguished by the penis, which is in *Islamia* bilobed.

**Etymology**: Named after the prefecture of Fez where the species has been collected.

**Fessia aouintii** n. sp. (fig. 3)

**Material studied**: Holotype: H = 0.7 mm, D = 1.2 mm, ZMH 140696; 5 paratypes (ZMH 140697), 6 in coll. Mebrouki, 3 in coll. Glöer.

**Type locality**: Morocco, Aouinat El Hajjaj, Fez prefecture, 34°01'39.1"N 4°58'24.1"W, 16.02.2020 leg.

**Figure 3.** *Fessia aouintii* n. sp. 1: frontal view (holotype), 2: apical view (holotype), 3: apical view (paratype, photographed under ethanol), 4: umbilical view (holotype), 5: head with penis (lateral view). Abbriviations: e = eye, o = operculum, p = penis.
**Etymology:** Named after the type locality.

**Habitat:** Aouinat El Hajjaj is a rheocenous natural spring, located at Fez prefecture at an altitude of 409 m above sea level. The grain size of the bottom consists of stones, pebbles and sand, the vegetation of the banks is very heterogeneous and highly disturbed. Located in the Oued Wisslane watershed near a weekly market ‘souk’, which has subjected it to very strong anthropogenic action, through solid and liquid waste, habitat loss and water abstraction. In addition, the entire area could be suffering from agricultural runoff and drainage of water. Consequently, the population of *Fessia aouintii* n. gen. n. sp. would be highly vulnerable, and it is arguably the most threatened hydrobid of Morocco. Major efforts are needed for its conservation, including studies on its biological and ecological knowledge.

**Description**

**Shell:** The tiny valvatoid shell is translucent with a silky surface. The 3.5 whorls are fast and rapidly growing separated by a deep suture. The body whorl is prominent and descends slowly on the shell wall. The shell is 0.8 mm high and 1.2 mm in diameter.

**Animal:** White with dark brown mantle pigmentation. Eye-spots large and visible.

**Penis:** Relatively small and flat with a broad basis and tapered at the distal end.

**Operculum:** Operculum flexible, without any peg, dark yellowish.

**Distribution:** Morocco, only known from the type locality.

**References**

Arconada, B. & Ramos, M.A. (2001) New data on Hydrobiidae systematics: two new genera from the Iberian Peninsula. *Journal of Natural History*, 35, 949–98.

Boeters, H.D., Glöer, P. & Pešić, V. (2014) *Arganiella tabaensis* n. sp. from Montenegro (Mollusca: Gastropoda: Hydrobiidae). *Ecologica Montenegrina*, 1(3), 131-139.

Bodon, M., Manganelli, G., Giusti, F. (2001) A survey of the European valvatiform hydrobid genera, with special reference to *Hauffenia* Pollonera, 1898 (Gastropoda: Hydrobiidae). *Malacologia*, 43, 103–215.

Chillasse, L. & Dakki, M. (2004) Potentialités et statuts de conservation des zones humides du Moyen-Atlas (Maroc), avec référence aux influences de la sécheresse. *Sécheresse* 15 (4), 337-45.

Dakki, M. (1997) Étude nationale sur la biodiversité : faune aquatique continentale (invertébrés et poissons). Rabat: Ministère de l’Environnement du Maroc; Programme des Nations unies pour l’environnement (PNUE), pp 117.

Giusti, F. & Pezzoli, E. (1980) Gasteropodi, 2. (Gastropoda: Prosobranchia: Hydrobioidea, Pyrguloidea). In: Consiglio Nazionale delle Ricerche. Collana del progetto finalizzato "Promozione della qualità dell'ambiente". Pubblicazione AQ/1/47. Guide per il riconoscimento delle specie animali delle acque interne italiane, 8: 66 + [1] pp.

Glöer, P., Mabrouki, Y. & Taybi, A.F. (2020) A new genus and two new species (Gastropoda, Hydrobiidae) from Morocco. *Ecologica Montenegrina*, 28, 1–6.

Mabrouki, Y., Taybi, A.F. & Berrahou, A. (2017) L'évolution spatio–temporelle de la qualité des eaux courantes de l'Oued Melloulou (Maroc), *Revue des Sciences de l'Eau* 30(3), 213–225.

Mabrouki, Y., Taybi, A.F., El Alami, M. & Berrahou, A. (2019) Biotypology of stream macroinvertebrates from North African and semi arid catchment: Oued Za (Morocco). *Knowledge and Management of Aquatic Ecosystems*, 420, 17.

Radoman P. (1983) Hydrobioidea a superfamily of Prosobranchia (Gastropoda). I. Systematics. Monographs Serbian Academy of Sciences and Arts, DXLVII, Department Sciences, 57, 1–256.

Taybi, A.F., Mabrouki, Y., Legssyer, B. & Berrahou, A. (2020) Spatio-temporal typology of the physico-chemical parameters of a large North African River: the Moulouya and its main tributaries (Morocco). *African Journal of Aquatic Sciences* DOI: 10.2989/16085914.2020.1727832. (in press).

Szarowska, M. (2006) Molecular Phylogeny, Systematics and Morphological Character Evolution in the Balkan Rissooidea (Caenogastropoda). *Folia Malacologica*, 14(3), 99–168.

Van Damme, D., Ghamizi, M., Soliman, G., McIvor, A. & Seddon, M.B. (2010) The status and distribution of freshwater mollusks. In Garcia, N., Cuttelod, A. & Abdul Malak, D. (eds.), The Status and Distribution of Freshwater Biodiversity in Northern Africa. IUCN.xiii, Gland, Switzerland, Cambridge, UK and Spain, 1–141 pp.