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TWO NEW SPECIES OF *MERCURIA* BOETERS, 1971 FROM MOROCCO (GASTROPODA, HYDROBIIDAE)

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Although *Mercuria* genus has received considerable attention in Morocco in terms of species discoveries, new species continue to be found in the country. The aim of this paper is to describe two new species of *Mercuria* found recently in northeastern Morocco.

Key words: Mercuria, Gastropoda, Morocco, new species

Taybi, A. F., Glöer, P. & Mabrouki, Y.: Dvije nove vrste roda *Mercuria* Boeters, 1971 iz Maroka (Gastropoda, Hydrobiidae). Nat. Croat., Vol. 31, No. 1, 63-69, Zagreb, 2022.

Iako je rod *Mercuria* u Maroku prilično dobro istražen, još uvijek se u zemlji otrkivaju nove vrste. Cilj rada je opisati dvije nove vrste roda *Mercuria*, nedavno pronađene u sjeveroistočnom Maroku.

Key words: Mercuria, Gastropoda, Maroko, nova vrsta

INTRODUCTION

Morocco is located in the Mediterranean basin hotspot, one of Earth's biologically richest and most endangered ecoregions. It houses the second greatest concentration of continental biodiversity in the Mediterranean basin with species diversity comprising more than 31,000 species, about 11 percent of which are endemic (USAID, 2008). This high rate of endemism is particularly observed in the freshwater biodiversity of the northern part of the country, due to its many geographical barriers, such as the Rif and Atlas Mountains, and the Moulouya River basin (Mabrouki *et al.*, 2019a, b; Marrone *et al.*, 2020; Taybi *et al.*, 2020). Morocco also has the most extensive river system within the northern African region, where a diversified molluscan fauna appears to live even in the aquifers in the karstic underground (Van Damme, 1984).

The family Hydrobiidae Stimpson, 1865 is one of the largest families within the Truncatelloidea superfamily; it has a cosmopolitan distribution and is made up of small to minute species that inhabit permanent aquatic ecosystems. It includes a number of genera in Moroccan territory, among those, the genus *Mercuria* Boeters, 1971, which has a western Palearctic freshwater snail distribution. Species of this genus also occur

in the western Mediterranean region, from south-eastern France to North Africa, and they are also widely distributed in the Atlantic coastal regions from Ireland, to Morocco (Glöer *et al.*, 2010; Glöer 2019).

Previously, the genus *Mercuria* was represented by eight species in Morocco: *M. globulina* (Letourneux & Bourguignat 1887); *M. atlasica* Mabrouki, Glöer & Taybi 2021; *M. bakeri* Glöer, Boeters & Walther, 2015; *M. tingitana* Glöer, Boeters & Walther, 2015; *M. targouasensis* Glöer, Boeters & Walther, 2015; *M. midarensis* Boulaassafer, Ghamizi & Delicado, 2018; *M. gauthieri* Glöer, Bouzid & Boeters, 2010; *M. tensiftensis* Boulaassafer, Ghamizi & Delicado, 2018. New investigations conducted recently through the eastern region of Morocco revealed two new species of the genus *Mercuria*. The aim of this paper is to describe these new species.

MATERIAL AND METHODS

Field surveys were conducted from 2014 (and are still ongoing) through the northern part of the country, including in its great natural barriers such as the Moulouya River basin and the Middle Atlas massif. Most of these sampling sites were visited several times. Our goal was to document maximum macroinvertebrate biodiversity in the different microhabitats investigated at each sampling site. The samples of benthic fauna were collected by a kick net and clamps. 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 (Leica M205C) with a digital camera (Leica DMC5400). The type material is stored in the Zoological Museum of Hamburg (ZMH).

RESULTS

Genus *Mercuria* Boeters, 1971

Type species: *Cyclostoma simile* Draparnaud, 1805.

The shell is whitish, especially in the region of the umbilicus. The penis possesses a large and flat triangular appendix.

Identification key for *Mercuria* species of Morocco

– Shell spherical, short spire 0.2–0.3 of shell height, shell height 2.4–3.0 mm ..... ***M. globulina***.

– Shell conical with 5.5 fast growing, slightly convex whorls with a deep suture. Shell 2.8–3.0 mm high and 1.9–2.0 mm broad. Penis broad and tapered at the tip, almost equal in length with the unpigmented penial appendix .... ***M. atlasica***.

– Shell conical with 5.5 slightly convex whorls with a deep suture. Shell height 3.0–3.5 mm, width 2.2–2.3 mm. Penis like a long strap, pigmented and lying above the penial appendix ..... ***M. bakeri***.

– Shell conical, the 5.5 whorls are slightly convex with a shallow suture. Shell height 3.5–3.8 mm, diameter 2.4–2.5 mm. Penis as long as penial appendix, with black short and triangular penis ..... ***M. tingitana***.

– Shell conical with 4.5-5 slightly convex whorls with a deep suture, the shell is 2.98–3.79 mm high and 2.5–2.6 mm broad. H: D = 1.2-1.3. The penis long and slen-

der, widened at the basis and tapered at the distal end
. . . . . ***Mercuria nadorensis*** sp. nov.

– Shell short-conical, The 5.5 whorls are slightly convex with a deep suture. Shell height 3.1–4.0 mm, diameter 2.1–2.9 mm. It has gradually tapering penis and slightly pigmented penial appendix, shorter than penis . . . . . ***M. targouasensis***.

– Shell ovate-conic, whorls 4–5, height 3–4.7 mm, H: D = 1.4. It has gradually tapering to strap-like penis and similarly pigmented penial appendix . . . . ***M. midarensis***.

– Shell solid and conical with 4.5–5.1 slightly rounded whorls with a clear suture, shell height 3.5–4.7 mm, shell width 2.5–3.1 mm. The penis is thin, almost as long as penial appendix . . . . . ***M. gauthieri***.

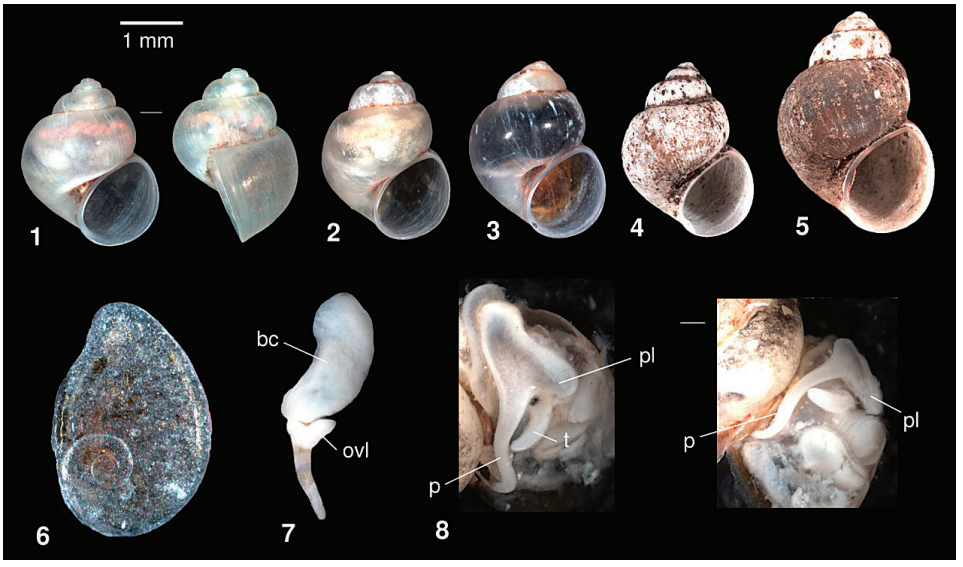
– Shell ovate-conic, whorls 4–5, height 3–5mm. With a gradually tapering dark pigmented penis with dark pigmented penial appendix. . . . . ***M. tensiftensis***.

– Shell conical with 4.5–5 slightly convex whorls with a deep suture. The shell is 5.4 mm high and 3.6–3.8 mm broad, H: D = 1.5–1.6. The penis is long and slender with a broad and large penial lobe . . . . . ***M. halouii*** sp. nov.

Mercuria nadorensis sp. nov. (Figs. 1-8)

Type material. Holotype. ZMH 140905, urn:lsid:zoobank.org:act:F887640D-DF51-4E6B-AA11-D58AB5646E60, shell height 2.98 mm, width 2.5 mm, 5 Paratypes: ZMH 140906, 5 paratypes coll. Glöer.

Description. The conical shell has 4.5-5 slightly convex whorls with a deep suture. The aperture is ovate, with a rounded angle at the top. The peristome is sharp, somewhat thickened at the inner lip. The umbilicus is slit like. The shell is whitish in the re-



Figs. 1–8. ***Mercuria nadorensis*** sp. nov. 1: Holotype, 2-5: paratypes, 2-3 preserved and photographed under ethanol, 4-5: dried shells, 6: operculum,7: bursa copulatrix, 8: penis *in situ*. Abbreviations: bc = bursa copulatrix, p = penis, pl = penial lobe, ovl = oviductl loop, t = tentacle.

gion of the columella (cleaned shells). The ratio of shell height to width = 1.2-1.3. The shell is 2.98-3.79 mm high and 2.5-2.6 mm broad. The translucent operculum is paucispiral with an excentric nucleus.

Anatomy. The penis is long and slender with a broad basis and a large penial lobe, as is characteristic for *Mercuria*. The basis of the penis and the penial lobe are pigmented. The female genitalia include a large, elongate ovate bursa copulatrix and a small receptaculum seminis.

Differential diagnosis. The new species can be distinguished from its congeners in Morocco by its relatively long and slender penis, slightly pigmented, widened at the basis and tapered at the distal end. It can be confused with *M. midarensis* H: D = 1.4, the latter has larger shells (shell height 3–4.7 mm and shell width 2-3 mm broad), and larger penial appendix, wider at the distal end.

Type locality. Source Oulad Bouazza, Nador, 12/04/2021, 35°02'51.0"N 3°06'55.0"W.

Habitat. The species was sampled from an irrigation canal in the Bouareg valley, near the village of Taourirt Bousetta, probably supplied by water from wells located on private property. As a general rule in this area, Hydrobiidae molluscs are confined to wells and springs at the foot of mountain chains and the low-altitude plains.

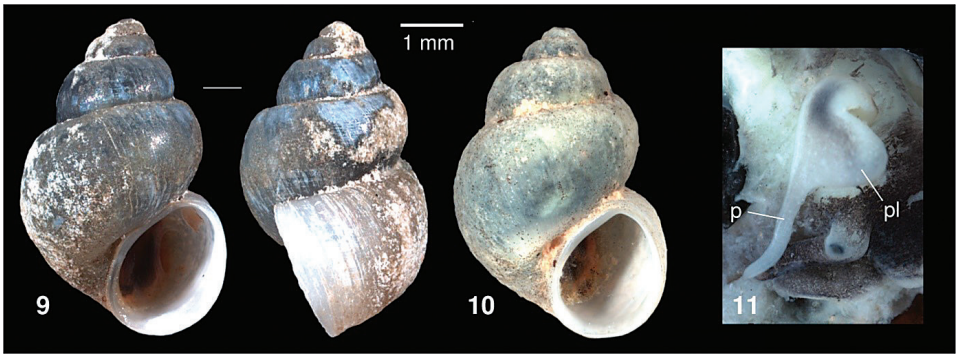
Distribution. Morocco; only known from type locality.

Etymology. The species was named after Nador province where the species was found.

Mercuria halouii sp. nov. (Figs. 9-11)

Type material. Holotype: ZMH 140907, urn:lsid:zoobank.org:act:25477922-67E3-40C6-8E95-C637C0FF2E26, shell height 5.4 mm, width 3.6 mm, 1 Paratypes: ZMH 140908.

Description: The conical shell has 4.5-5 slightly convex whorls with a deep suture. The aperture is ovate, somewhat oblique. The peristome is sharp, slightly thickened at the inner lip. The umbilicus is slit-like. The shell is whitish in the region of the columella (cleaned shells). The ratio of shell height to width = 1.5-1.6. The shell is 5.4 mm high and 3.6-3.8 mm broad.



Figs. 9–11. *Mercuria halouii* sp. nov. 9: Holotype, 10: paratype, 11: penis *in situ*. Abbreviations: p = penis, pl = penial lobe (in alcohol).

Anatomy: The penis is long and slender with a broad and large penial lobe. The basis of the penis and the penial lobe are pigmented.

Differential Diagnosis. This new species can be confused with *M. nadorensis* n.sp. However, *M. nadorensis* sp. nov. is much smaller and more globular (H:D = 1.2-1.3) than *M. halouii* (H :D = 1.5-1.6).

Type locality: Bouareg, Nador province, 10/07/2021, 35°04'44.0"N 2°55'42.2"W.

Habitat. The type locality is a spring located near the village of Oulad Bouazza which is 8 km away from the town of Al Aroui, at an altitude of 1075 m. The spring was arranged as a well with a depth of 6 m and a diameter of 5 m. The vegetation is sparse and the area is sunny. This feature was also documented for other *Mercuria* species in the eastern region of Morocco (e.g. M. *globulina* and *M. bakeri*).

Distribution: Morocco; only known from type locality.

Etymology. The species is named in honour of Professor Benyounes Haloui (Mohamed Premier University of Oujda), in recognition of the many years of teaching generations at the Faculty of Sciences of Oujda and for scientific works related to the natural ecosystems of Morocco.

DISCUSSION

Mercuria nadorensis sp. nov. and *Mercuria halouii* sp. nov. can be distinguished from their Moroccan congeners by penis morphology in combination with the shell characters. Our findings raise the known biodiversity of the *Mercuria* genus in Morocco to ten species (Mabrouki *et al.,* 2021a). *Mercuria midarensis* is distributed mostly in nort-

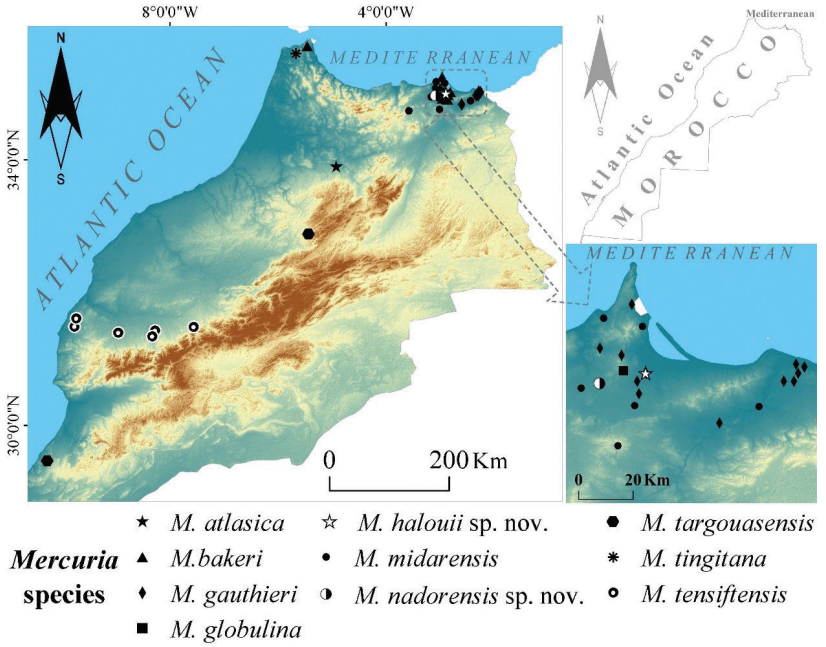


Fig. 12. Distribution of *Mercuria* spp in Morocco.

heastern Morocco, *M. tensiftensis* can be found in proximal localities of the Tensift River basin in northwestern Morocco (Boulaassafer *et al.*, 2018). *Mercuria atlasica* can be found in the edge of the Middle Atlas in the Fez region, *M. tingitana* seems restricted to its type locality in the Tingitane Peninsula, *M. bakeri* is restricted to the northern part of the country, *M. targouasensis* can be found in coastal streams in south-western Morocco and in a spring-fed habitat in the Middle Atlas. While *M. nadorensis* sp. nov., *M. halouii* sp. nov., *M. globulina* and *M. gauthieri* are restricted to the oriental region of Morocco, the latter two can also be found in northwest Algeria (Gloër *et al.*, 2010).

The oriental region of Morocco has the highest number of *Mercuria* species, especially in the eastern Rif and the Lower Moulouya River basin (Fig. 12), this number of species being linked to the high variability and heterogeneity of biotopes of the studied area, but also to extensive investigations. Given the number of new species and genera discovered during the last decade in this country (Glöer *et al.*, 2015; Glöer *et al.*, 2020a, b; Ghamizi, 2020; Mabrouki *et al.*, 2021b; Mabrouki *et al.*, 2022; Taybi *et al.*, 2021), the discoveries of new hydrobiid snails or other molluscan taxa known to occur in Morocco will certainly increase with further studies and investigations.

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