

Freshwater Snails of Tabuk Region, Northern Saudi Arabia

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Abstract

Two freshwater snail species (*Melanoides tuberculata* and *Melanopsis buccinoidea*) belonging to two families (Thiaridae and Melanopsidae), respectively, were recorded for the first time from six localities in Tabuk region, northern Saudi Arabia.

Keywords: Freshwater Snails, Gastropods, Tabuk region, Saudi Arabia.

1. Introduction

Despite that Saudi Arabia is considered one of the driest countries in the world, comprehensive studies on the Saudi Arabian freshwater snails were conducted (Brown and Wright, 1980; Neubert, 1998). A total of 29 species were recorded covering the entire Arabian Peninsula, with the highest diversity in Yemen. These studies covered the eastern, western, south western regions of Saudi Arabia.

Studies on the freshwater snails of the northern regions of Saudi Arabia are scarce. A recent study on the freshwater snails in the northern region of Saudi Arabia was conducted by Amr and Alshammari (2012), with a single record of one species, *Bulinus beccari*, in Hail region. Studies of the freshwater snails in Tabuk region, northern Saudi Arabia, are unavailable. The aim of this study is to document the freshwater snail fauna in the Tabuk region.

2. Materials and Methods

2.1. Study Area

Tabuk is a province of Saudi Arabia, located along the north-west coast of the country, facing Egypt across the Red Sea. The boundaries of Tabuk region extend from the

Saudi-Jordanian borders in the north to the north of Medina Al Munawwarah Province, and from the Red Sea on the west to the Hufa depression in the east. It lies at the junction of Hejaz mountain range and the plains of the north in the basin of sedimentary area (Figure 1a).

Seventy-five freshwater localities, representing several aquatic habitats (springs, artificial lakes, swamps, and streams, ponds and irrigation canals), were visited between 2012 and 2014; six sites only had records of *Melanoides tuberculata* and *Melanopsis buccinoidea* (Table 1, Figure 1b). Coordinates for the six sites were recorded using Eten smarts Global Position System. Physico-chemical parameters for the freshwater locations were measured: air and water temperature, dissolved oxygen (mg/l), total dissolved salts (ppt), and pH (Table 2). Samples were collected manually, labeled and preserved in plastic containers containing 70% ethanol.

Table 1. Localities from which materials were collected.

Locality	N	E
TayyebEsm	28 33 591"	34 48 089"
Magna	28 23 787"	34 45 063"
Geyal	28 09 736"	35 02 482"
Deba	27 41 123 "	35 29 096 "
Aldeesah	27 38 021"	36 31 284 "
Umluj	25 04 215"	37 20 982"

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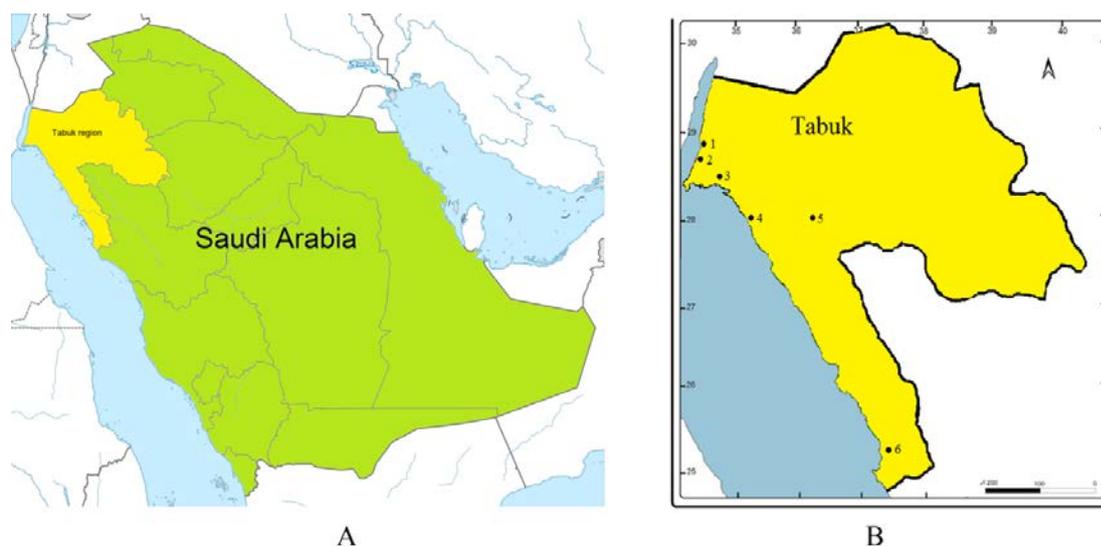


Figure 1. (A) Location of Tabuk region in Saudi Arabia (B) Freshwater localities that showed records in Tabuk region

Table 2. The physico-chemical parameters of different sites measured during sampling.

Site No.	Site name	Maximum depth (cm)	Temperature		Conductivity (μ s)	Total Dissolved salts (ppt)	Dissolved oxygen (mg/l)	pH	Transparency (cm)
			Air	Water					
1	TayyebEsm (Permanent stream inside the mountain with a length about 1Km).	30	25	21	5420	3.85	6.99	8	Clear
2	Magna (Moosa springs).	50	25	28	2450	1.37	6.01	8	Clear
3	Geyal (Artificial lake in a farm filled with ground water for irrigation).	200	26	31	5910	3.64	6.15	8	very clear
4	Deba (Pond in a farm at Al-moweelah)	150	26	22	12780	9.06	9.40	8	very clear
5	Aldeesah (Running water from the mountain)	-	23	23	487	0.262	NR	8	very clear
6	Umluj (A pond at a farm)	100	30	29	4050	2.86	4.88	8	Clear

3. Results

A total of 220 freshwater snail individuals were collected from the study area. Snails were identified as *Melanoides tuberculata* (Family Thiaridae) and *Melanopsis buccinoidea* (Family Melanopsidae).

3.1. Family Thiaridae

Appendix A. *Melanoides tuberculata* (Müller, 1774)

Appendix B. Description: Shells vary in size, the larger ones reaching nearly 50 mm in length and containing up to 15 whorls. The shell is imperforate, and has moderately rounded whorls, which are separated by moderately impressed sutures. The shell surface is sculptured with transverse ribs and spiral ridges and grooves. The shell is light horn or somewhat darker in color, with reddish-

brown color patches. The anterior shell aperture is evenly curved (Figure 2a).

Distribution: Distributed in artificial lakes, ponds, springs and streams in Aldeesah, Geyal, Deba, Umluj, and in Moosa springs on Magna near Gulf of Aqaba (Figure 3).

3.2. Family Melanopsidae

Appendix C. *Melanopsis buccinoidea* (Olivier, 1801)

Description: The shell is turreted and broad conical; it has a shiny black color, commonly reaches a length of 20 mm and has flat and smooth whorls (Figure 2b).

Distribution: Distributed in the springs and streams near the Gulf of Aqaba, recorded in TayyebEsm and Moosa springs in Magna (Figure 3).



Figure 2. Shells of (A) *Melanioides tuberculata* and (B) *Melanopsis buccinoidea* from Tabuk region.

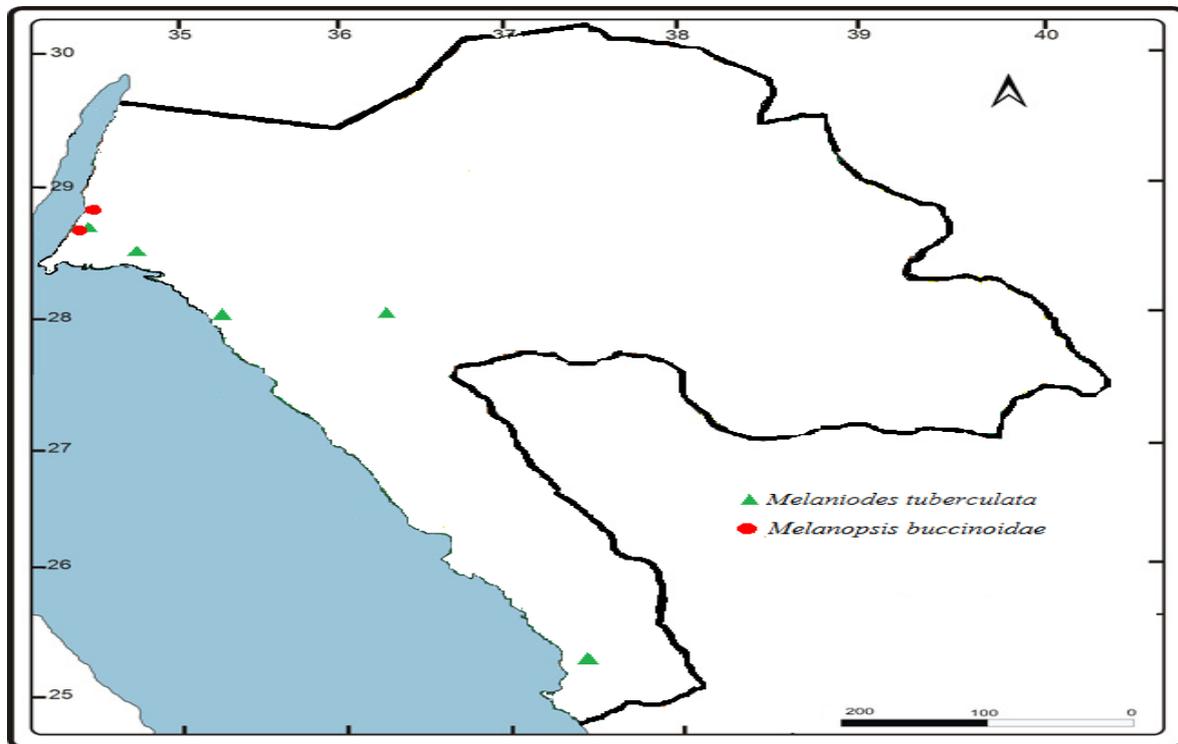


Figure 2. Distribution of *Melanioides tuberculata* and *Melanopsis buccinoidea* in Tabuk region.

4. Discussion

The most recent comprehensive study on the freshwater snails of Saudi Arabia and Arabian Peninsula (Neubert, 1998) recorded a total of 29 freshwater snail species distributed over the Arabian Peninsula; the localities of the recorded species were distributed in the central province, eastern province, southern Hejaz, and Asser Mountains in the South west of Saudi Arabia (Neubert, 1998; Bin Dajem, 2009). On the other hand, the freshwater malacofauna of the northern regions of Saudi Arabia is not well-known; the most recent study on the freshwater snails in the northern regions of Saudi Arabia was conducted by Amr and Alshammari (2012), recording one freshwater snail of the genus *Bulinus* in Hail region.

During the present study, two species (*M. tuberculata* and *M. buccinoidea*) were recorded for the first time in Tabuk region. *Melanioides tuberculata* is known to carry

several trematode parasites which are dangerous to humans. Pinto and de Melo (2011) compiled a checklist of 37 species of trematode parasites from the *M. tuberculata* which is considered as the first intermediate host, eleven of these trematodes were parasites for human.

Melanioides tuberculata was more abundant and was recovered from five sites, compared with two sites for *M. buccinoidea*. According to Neubert (1998), *M. tuberculata* is the most common freshwater snail in the Arabian Peninsula.

Melanopsis buccinoidea is the most common smooth shelled *Melanopsis* species in the Levant (Helleret *et al.*, 2005; Amr *et al.*, 2014). *Melanopsis praemorsa* is considered to be a superspecies by Glaubrecht (1993), whereas, if we follow Brown (1994) who based his conclusion on older articles, then there exists only a single *Melanopsis* species (*M. praemorsa*) with a disjunct range along the Mediterranean-Black Sea. Ever since, this view has been abandoned (e.g. Heller *et al.*, 2005) for the

Levantine species and concluded that *M. praemorsa* does not occur in the Mediterranean region. According to the view of Heller *et al.* (2005), *M. praemorsa* does not occur in Saudi Arabia; therefore, the *Melanopsis* species, recorded by Neubert (1998), is not for *M. praemorsa*; rather, it is for *M. buccinoidea*.

The recording of the two freshwater snails *Melanoides tuberculata* and *Melanopsis buccinoidea* in Tabuk region will pave the way for future taxonomical ecological studies.

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References

- Amr ZM and Alshammari MA. 2012. First record of the freshwater snail *Bulinus beccari* (Paladilhe 1872) the intermediate host of the parasite *Schistosoma haematobium* in Ha'il province Saudi Arabia. *Inter J Current Res.*, **4**:48-49.
- Amr ZS., Nasarat H and Neubert E. 2014. Notes on the current and past freshwater snail fauna of Jordan. *Jordan J Natural History*, **1**:83-115.
- Bin Dajem SM. 2009. Freshwater snails in Asser region, Saudi Arabia with special refernceto the zoonotic trematode. *J Egyptian Soc Parasito.*, **39**: 555-557.
- Brown DS and Wright CA. 1980. Molluscs of Saudi Arabia. Freshwater molluscs. *Fauna of Saudi Arabia*, **2**: 341-358.
- Glaubrecht M. 1993. Mapping the diversity: Geographical distribution of the freshwater snail *Melanopsis* (Gastropoda: – Cerithioidea: Melanopsidae) with focus on its systematics in the Mediterranean basin. *Mitteilungen aus dem Hamburgischen Zoologischen Museum und Institut*, **90**: 41-97.
- Heller J, Mordan P, Ben-Ami F and Sivan N. 2005. Conchometrics, systematics and distribution of *Melanopsis* (Mollusca: Gastropoda) in the Levant. *Zoological J Linnean Soc.*, **144**: 229-260.
- Neubert E. 1998. Annotated checklist of the terrestrial and freshwater mollusks of the Arabian Peninsula with descriptions of new species. *Fauna of Arabia*, **17**: 333–461.
- Pinto HA and de Melo AL. 2011. A checklist of trematodes (Plathelminthes) transmitted by *Melanoides tuberculata* (Mollusca: Thiariidae). *Zootaxa*, **2799**: 15-28.