Some records of freshwater snail from the Occupied Palestinian territories

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ABSTRACT

This study contributes to the taxonomy and distribution of the freshwater snail fauna in the Occupied Palestinian Territories. A total of 10 species of freshwater snails belonging to five families (Neritidae, Melanopsidae, Lymnaeidae, Physidae and Thiaridae) in seven genera (*Galba, Haitia, Lymnaea, Melanoides, Melanopsis, Pseudoplotia* and *Theodoxus*) were collected. *Melanopsis buccinoidae* was the most common species. *Theodoxus jordani* and *Theodoxus macrii* were noted mostly around the Jordan River basin.

Key Words: Freshwater Snail, Occupied Territories, Palestine, West Bank, Gastropoda.

INTRODUCTION

The Occupied Palestinian Territories, known also as the West Bank, has a rather moderate climate with mostly Mediterranean mountain habitats sloping into the Jordan valley, part of the Great Rift Valley stretching from East Africa to Syria. Despite limitation of water resources in the area, there are some permanent water sources suitable for freshwater snails. Since the occupation of the West Bank, no studies on the freshwater snails of the occupied territories have been undertaken. Previous studies on the freshwater snails of historical Palestine include Tristram (1865) and Germain (1921-1922). Abdel-Azim & Gismann (1956) included data on freshwater snails collected from the West Bank during a study on the snail intermediate host for schistosomiasis in south-western Asia. Recent studies on the snails of the genus *Melanopsis* including records from the West Bank was published by Heller *et al.* (2015). Recently, Bdir & Adwan (2011; 2012) investigated the presence of larval stages of trematodes among freshwater snails collected from the Palestinian Territories.

Regionally, interests in freshwater snails in the Middle East as intermediate hosts for trematodes affecting human and animals resulted in several publications (Burch & Amr, 1990; Neubert, 1998; Amr & Abu-Baker, 2004; Bössneck, 2011; Milstein *et al.,* 2012; Amr *et al.,* 2014).

After the establishment of the Palestine Museum of Natural History (PMNH) in 2014, one of its obligations is to identify the neglected biodiversity elements of the West Bank. In this communication we report on ten species of freshwater snails at the collection of Palestine Museum of Natural History.

Materials and Methods

All specimens were collected from West Bank Territories through several field trips by PMNH team. We collected samples in eighteen localities (Table 1). We classified specimens according to references cited by aid of visual inspection including with a stereo dissecting microscope.

Table 1: Coordinates for locations from which snails were collected.

Location	N	E
Aboud- Wadi Al-Hakeem	32° 1’	35° 4’
Ain Al Beda	32° 22’	35° 30’
Ain Al Ogga	31° 57’	35° 23’
Ain Al Sulttan	31° 52’	35° 26’
Ain Dyouk	31° 52’	35° 26’
Ain Fashkha	31° 44’	35° 28’
Ain Kenya	31° 55	35° 9’
Ain Shible	32° 13’	35° 25’
Al Ogga	31° 57’	35° 29’
Bethlehem	31° 42’	35° 12’
Jiftlik	32° 8’	35° 29’
Kishda	32° 18’	35° 19’
Ras Nakura	32° 22’	35° 33’
Salfit	32° 5	35° 10
Tal Al Smayrat	31° 52’	35° 26’
Wadi Fukeen	31° 71’	35° 10’
Wadi Qana	32° 10’	35° 8’
Wadi Qilt	31° 50’	35° 24’

RESULTS

A total of 10 freshwater snails belonging to five families (Neritidae, Melanopsidae, Lymnaeidae, Physidae and Thiaridae) in seven genera (*Galba, Haitia, Lymnaea, Melanoides, Melanopsis, Pseudoplotia,* and *Theodoxus*) are reported.

Family Neritidae (Rafinesque, 1815)

***Theodoxus jordani* (Sowerby, 1844)** **Figure 1A**

Materials examined: Ras Nakura (PMNH4473a, 5.11.2013; PMNH4480b, 5.11.2013); Jiftlik (PMNH7550, 21.3.2016).

Remarks: This is a wide spread species in western Asia extending along the Orontes basin reaching the Jordan River basin (Bössneck, 2011; Amr *et al*.,

2014). In Palestine, its distribution is confined along the Jordan River (Milstein *et al*., 2012). It is found in large numbers attached to rocks in running water and prefers clear and fast running water. Barash & Zenziper (1980) studied the reproduction of *Th. jordani*.

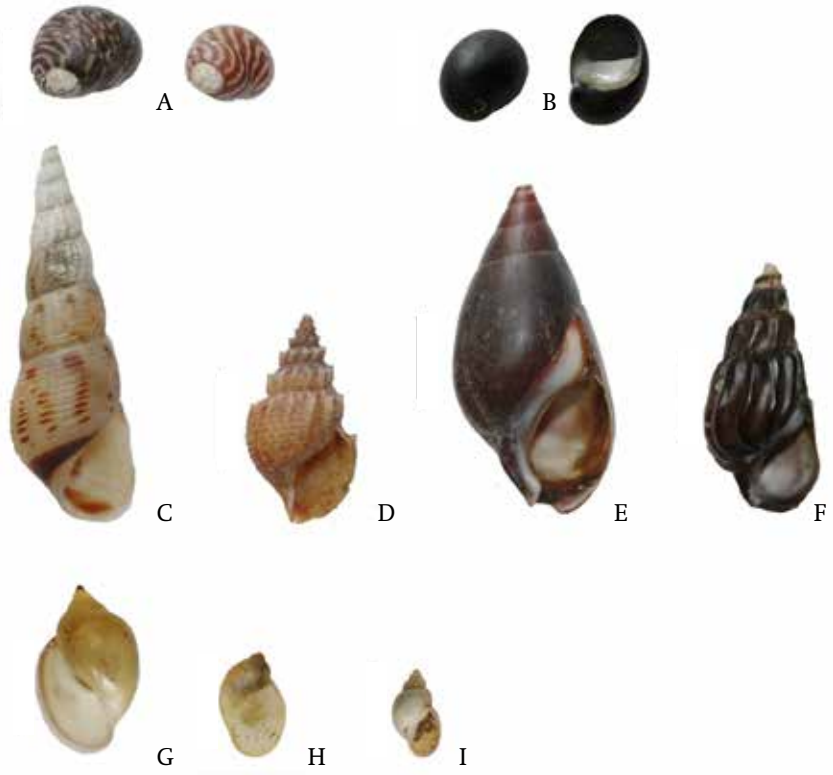

Figure 1: A. *Theodoxus jordani*. B. *Theodoxus macrii*. C. *Melanoides tuberculata*. D. *Pseudoplotia scabra*. E. *Melanopsis buccinoidea*. F. *Melanopsis saulcyi*. G. *Haitia acuta*. H. *Lymnaea natalensis*. I. *Galba truncatula*.

***Theodoxus macrii* (Sowerby, 1844)** **Figure 1B**

Materials examined: Aboud-Wadi Al-Hakeem (PMNH7020, 27.7.2015); Ras Nakura, (PMNH5565, 1.2.2014, PMNH4473b, 5.11.2013, PMNH4474, 5.11.2013, PMNH4480a, 5.11.2013); Ain Al Sulttan (PMNH7428, 21.12.2015); Ain Al Ogga (PMNH7432, 21.12.2015); Ain Dyouk (PMNH7436, 21.12.2015); Tal Al Smayrat (PMNH7443, 21.12.2015).

Remarks: Milstein *et al.* (2012) referred to *Th. macrii* in Palestine as *Theodoxus michonii* with no verification. We will accept the name *Th. macrii* for the meantime, until a clear justification for its taxonomic status. This freshwater snail has a wide range of distribution extending from Syria to Jordan and Palestine southward to Iraq eastwards (Burch *et al*., 1989). It is mostly an inland species known from streams and spring.

Family Melanopsidae (Adams & Adams, 1854)

Melanopsis buccinoidea (Olivier, 1801) **Figure 1E**

Materials examined: Aboud- Wadi Al-Hakeem (PMNH7021, 27.7.2015); Ain Al Beda (PMNH7264, 16.9.2015); Ain Kenya (PMNH7082, 3.8.2015); Ain Fashkha (PMNH4472, 5.11.2013, PMNH4471a, 5.11.2013); Ain Al Ogga (PMNH7411, 4.12.2014, PMNH7433, 21.12.2015); Ras Nakura (PMNH4464, 1.2.2014; PMNH4479, 5.11.2013); Salfit (PMNH7317, 2010); Wadi Fukeen (PMNH7049, 29.7.2015), Wadi Qana (PMNH5188, 1.2.2014 ; PMNH4469, 1.2.2014); Wadi Qilt (4468, 5.11.2013); Ain Al Sulttan (PMNH7427, 21.12.2015); Al Ogga (Palm Farm) (PMNH7431, 21.12.2015); Ain Dyouk (PMNH7437, 21.12.2015), Tal Al Smayrat (PMNH7441, 21.12.2015); Jiftlik (PMNH7548, 21.3.2016).

Remarks: This is a common species inhabiting inland water bodies away from the Jordan River Basin. *Melanopsis biccinoidea* is the most common species in Palestine. It is associated with clear and fast running water. Bdir & Adwan (2011 & 2012) referred to the Palestinian population of this species as *Melanopsis praemorsa*. Schütt & Sesen (1989) considered all *Melanopsis* of the Levant as *M. praemorsa*. This was supported by Heller *et al*. (2005), whom recognized five smooth-shelled *Melanopsis* species; *M. buccinoidea, M. ammonis, M. dircaena, M. khabourensis* and *M. meiostoma.*

Melanopsis costata costata (Olivier, 1804) **Figure 1F**

Materials examined: Ras Nakura (PMNH4475, 5.9.2013; PMNH4477, 5.9.2013); Jiftlik (PMNH7549, 21.3.2016).

Remarks: In the Levant, *M. costata* is represented by four subspecies; *M. c. costata, M. c. lampra, M. c. jordanica* and *M. c. oblique* (Heller *et al*., 2005). This subspecies is widely distributed in the Levant (Heller *et al*., 2005). It is found on rocks near water and in the river, spring and swamp in the Jordan Valley near the River Jordan (Burch & Amr, 1990).

Melanopsis saulcyi (Bourguignat, 1853)

Materials examined: Ras Nakura (PMNH6937, 6.9.2015), Ain Al Sulttan (PMNH7426, 21.12.2015); Jiftlik (PMNH7547, 21.3.2016).

Remarks: This species was reported from Palestine, Jordan and Syria (Heller *et al*., 2005; Amr *et al*., 2014). It is found on rocks along the mud of springs, and in slow running water stream and close to aquatic vegetation (Amr *et al*., 2014; Lev *et al*., 2007).

Family Thiaridae (Gill, 1871)

Melanoides tuberculata (Müller, 1774) **Figure 1C**

Materials examined: Ain Fashkha (PMNH4470, 5.9.2015); Ras Nakura (PMNH4479, 5.9.2013); Al Ogga (Palm Farm) (PMNH7429, 21.12.2015); Ain Dyouk (PMNH7435, 21.12.2015); Tal Al Smayrat (PMNH, 21.12.2015); Ain Al Ogga (PMNH7434, 21.12.2015).

Remarks: This species has a wide distribution across Africa, Asia and Australia (Brown, 1980). This nocturnal species found under rocks and beneath decaying plants in relatively saline water course around the Dead Sea area.

Pseudoplotia scabra (Müller, 1774) **Figure 1D**

Materials examined: Ras Nakura (PMNH4482, 5.9.2013).

Remarks: This species is considered as one of the most successful invasive species in many parts of the world (Thompson *et al*., 2009). Its natural habitat extends over South and Southeast Asia, and the Indo-Australian Archipelago extending eastwards to the western Pacific Islands (Thompson *et al*., 2009). Recently, it became a dominant species in Lake Tiberius, reaching as much as 95% of the total freshwater snail fauna, and bringing four native species to the brink of extinction (Heller *et al*., 2014). It became established in many countries in the Arabian Peninsula (Brown & Wright 1980, Brown & Gallagher 1985, Neubert, 1998; Feulner & Green, 1999) and Jordan (Amr *et al*., 2014).

Family Lymnaeidae (Ranfinesque, 1815)

Galba truncatula (O.F. Müller, 1774) **Figure 1I**

Materials examined: Bethlehem (PMNH7418, 4.12.2015); Tal Al Smayrat (PMNH7444, 21.12.2015).

Remarks: Species of this genus have undergone various radical revisions. Previously, species of *Galba* in the Middle East were placed under the genus *Lymnae*. This species is associated with slow running water and most often found in mud in irrigation canals.

Lymnaea natalensis (Krauss, 1848) **Figure 1H**

Materials examined: Kishda (PMNH7425, 16.12.2015).

Remarks: The taxonomic status of this species is far from being resolved. Some taxonomists considered the species *natalensis* under the genus *Radix* (Bargues *et al*., 2001; Milstein *et al*., 2012). In other areas in Palestine, it is associated with the Mediterranean ecozone.

Family: Physidae (Fitzinger, 1833)

Haitia acuta (Draparnaud, 1805) **Figure 1G**

Materials examined: Bethlehem (PMNH7316, 22.10.2015); Ain Shible (PMNH7421, 16.12.2015); Tal Al Smayrat (PMNH7442, 21.12.2015); Al Ogga (Palm Farm) (PMNH7430, 21.12.2015).

Remarks: This is one of the most common species inhabiting water bodies in the Jordan Valley (Amr *et al*., 2014). It is usually associated with polluted water courses and slow running or still water bodies.

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