

Melanoides tuberculata (Red-rimmed Melania)

Superfamily Cerithioidea (Spire Snails)

Class: Gastropoda (Snails and Slugs)

Phylum: Mollusca (Molluscs)



Fig. 1. Red-rimmed melania, *Melanoides tuberculata*.

<http://www.cabi.org/isc/datasheet/75617>, downloaded 2 April 2015]

TRAITS. *Melanoides tuberculata* is an operculate snail which shows broad phenotypic variation (Vogler et al., 2012). The shell is elongate and has a brownish colour (Fig. 1) with a number of whorls which increase in size with distance down the shell to the end opening. The whorls have thinner spiral striations and their number correlates with the length of the shell. The average shell length is 26mm and the whorl numbers range from 3 in the young to 8-11 in adults. Some individuals show loss of the tip of the shell (Fig. 2). The head is flattened, with a pair of tentacles with eyes at their bases. The mouth is anterior (at the front of the head). It also has an operculum and papillae attached to the mantle end (Bolaji et al., 2011). Males are distinguished from females by the presence of a red coloured testis internally (Heller and Farstey, 1990).

DISTRIBUTION. Native to northern Africa and southern Asia, also widely introduced in northern Australia and European Mediterranean countries (Vogler et al., 2012), with a rising population in the Caribbean and North America including Trinidad and Tobago.

HABITAT AND ACTIVITY. Occupies a variety of habitats, ranging from weakly saline close to sea-level to freshwater of higher altitudes (Berry and Kadri 1973). *Melanoides tuberculata* thrives in a wide range of pH and hardness and it is found in different kinds of substrate but most commonly in rock or mud (Vogler et al., 2012; Shanahan et al., 2005). The species colonises stable water bodies such as rivers, dams, streams, lakes and levees with for the most part low flow rates and furthermore is known to utilize environments with diverse amount of eutrophication and is tolerant to harsh conditions such as low oxygen

concentration, high levels of pollutants and periods of drought (Vogler et al., 2012). Evidence suggests that temperature affects distribution patterns (De Kock and Wolmarans, 2009). *Melanoides tuberculata* are concentrated in regions with moderate temperatures ranging from 21-30°C.

FOOD AND FEEDING. *M. tuberculata* does most of its feeding at night. Developing young diet comprises other egg yolks and brood-pouch reserves (Aquatic Nuisance Species, 2007) while mature juveniles come into view from brood-pouches and adults from their substrate at nightfall slowly searching for food. The species feeds on different types of algae, bacteria, deposits of organic materials and putrefying flora. Although the snails have eyes, their vision is relatively poor therefore they rely on their strong sense of smell to find food.

POPULATION ECOLOGY. In the New World there are studies showing that where *M. tuberculata* is abundant there is a decline in native gastropods (Vogler et al., 2012). However it is noted that *M. tuberculata* can coexist with a pulmonate snail fauna if there is an opportunity for them to adapt to one another, for instance *M. tuberculata* populations of Africa coexist with *Biomphalaria* as well as *Bulinus tropicus* and *Lymnaea natalensis* since any competitive displacement would have happened much earlier (Dillon, 2000; 222-223). Populations in Hong Kong and Malaysia are composed of mostly females and hardly any males. A study in Israel revealed that males were not common in populations, occurring only at a frequency of 10.6% in 34 populations that were sampled. Two of the highest frequencies of males were found in unstable habitats i.e. those which have been dry for two years or more and lack diversity being populated mostly by *M. tuberculata*. The migration of this species to such environments was explained by bird dispersal (Heller and Farstey, 1990).

REPRODUCTION. Both parthenogenetic (virgin birth) and sexual reproduction occur. The species is viviparous (live-bearing); embryos develop in brood-pouches and are released as juveniles (Heller and Farstey, 1990). The number and size of young in brood pouches changes with the environment but is proportional to parent shell height. Fully developed juveniles hatch between nightfall and midnight possibly due to general increase in activity of the species at this time. Freshly hatched juveniles vary in length between 1-2mm. The average life expectancy of *M. tuberculata* is 2.5-3 years. It generally has a high birth rate and a low mortality rate. Population sizes increase rapidly and can be maintained for long periods (Vogler et al., 2012).

APPLIED ECOLOGY. *M. tuberculata* acts as an intermediate host for species that are parasitic to humans and other vertebrates, such as trematodes, *Gastrodiscus aegyptiacus* flukes etc (De Kock and Wolmarans, 2009). However, colonization of *M. tuberculata* is seen as beneficial to public health in the Caribbean for the reducing effects they have on other snails that act as intermediate host to disease e.g. *Biomphalaria glabrata* the main host for intestinal schistosomiasis (CABI, 2013).

REFERENCES

- Aquatic Nuisance Species. 2007. "Melanoides tuberculata - Red-rimmed Melania". Accessed March 20, 2015. http://el.ercd.usace.army.mil/ansrp/ANSIS/ansishelp.htm#html/melanoides_tuberculata_red_rim_med_melania.htm
- Berry, A.J and Arbain Bin Haji Kadri. 1973. "Reproduction in Malayan Freshwater Cerithiacean Gastropod Melanoides Tuberculata". Journal of Zoology Volume 172 issue 3: 369-381.
- Bolaji . D, Edokpayi .C, Samuel .O, Akinnigbagbe .R and Ajulo . A. 2011. "Morphological characteristics and Salinity tolerance of Melanoides tuberculatus (Muller, 1774)". World Journal of Biological Research 004: 2
- CABI. 2013. "Invasive Species Compendium- Melanoides tuberculata (red-rimmed melania)". Accessed March 18, 2015. <http://www.cabi.org/isc/datasheet/75617>

- De Kock, K. N.; Wolmarans, C. T. 2009. "Distribution and habitats of *Melanoides tuberculata* (Müller, 1774) and *M. victoriae* (Dohrn, 1865) (Mollusca: Prosobranchia: Thiaridae) in South Africa". *Water SA* Vol. 35 No. 5:713
- Dillon, Robert.T Jr. 2000. "The Ecology of Freshwater Molluscs". Cambridge University Press.
- Heller, Joseph and Viviana Farstey. 1990. "Sexual and Parthenogenetic Populations of Fresh Water Snails *Melanoides Tuberculata* in Israel". *Israel Journal of Zoology* vol.37: 75-87
- Shananhan, Timothy.M, Jeffery S. Pigati, David L. Dettman and Jay Quade. 2005. "Isotopic variability in the aragonite shells of freshwater gastropods living in springs with nearly constant temperature and isotopic composition". *Geochimica et Cosmochimica Acta*, Vol. 69, No. 16, pp. 3949–3966.
- Van Damme, D. 2014. "*Melanoides Tuberculata*". The IUCN Red List of Threatened Species. Version 2014.3.
- Vogler, Robert, Veronica Nunez, Diego.E. Gultierrez Gregoric, Ariel A. Beltramino and Juano G. Peso. 2012. "*Melanoides Tuberculata*: The History of an Invader. Snail: Biology, Ecology and Conservation". Nova Science publishers Inc. ISBN: 978-1-62100-788-3.

Author: Janet Joseph

Posted online: 2015



Fig. 2. *Melanoides tuberculata* shells with broken tops.

[http://en.wikipedia.org/wiki/Red-rimmed_melania, downloaded 27 April 2015]

For educational use only - copyright of images remains with original source