

WATER SNAILS INTRODUCED INTO THE BOTANIC GARDEN IN CRACOW

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ABSTRACT: Five species of molluscs, including *Melanooides tuberculata* (O. F. Müller, 1774) and *Helisoma duryi* (Wetherby, 1879) occur in a water basin, in the hothouse of the Botanic Garden in Cracow. The first mentioned snail inhabits a. o. the Near East and Eastern Africa while the latter one – Florida and Southern Africa. Another species – *Physa acuta* Draparnaud, 1805 spreads from the Southern Europe and for 30 years is adapted to polluted and heated waters in industrial regions in Southern Poland.

KEY WORDS: freshwater molluscs, Gastropoda, Thiariidae, Planorbidae, Physidae, invasive species

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Water Snails Introduced into the Botanic Garden in Cracow

In greenhouses of the Botanic Garden in Cracow a few species of water snails living in Africa and around the Mediterranean have been found recently. One of them - *Physa acuta* DRAPARNAUD, 1805 (Fig. 1: P) was noted first time about 65 years ago. After the World War 2nd it appeared in rivers and stagnant water bodies of the South and Central Poland, and now it is quite well adapted to natural environment conditions in the area. The species tolerates polluted and heated water and, therefore, it occurs commonly in industrial regions in water bodies situated close to power stations, factories and ironworks (DUTKIEWICZ 1959, ALEXANDROWICZ 1986, STRZELEC 1988, SERAFIŃSKI, REMBECKA & STRZELEC 1989).

Fifteen years ago a new, large hothouse was constructed in the Botanic Garden of the Jagiellonian University in Cracow. Inside it a water basin with tropical and subtropical plants was founded. Five species of molluscs inhabit this basin:

- *Lymnaea stagnalis* (LINNAEUS, 1758), a species living in Poland, a.o. in the Cracow area, in many localities;
- *Physa acuta* DRAPARNAUD, 1805, the species mentioned above, known from older greenhouses of the Botanic Garden as well as from the Vistula River near Cracow as a dominant molluscan species there (ALEXANDROWICZ 1988);
- *Musculium lacustre* (O. F. MÜLLER, 1774), a palearctic bivalve species commonly inhabiting small water bodies all the Europe and in North Africa, well adapted to resist drought periods;
- *Melanoides tuberculata* (O. F. MÜLLER, 1774), and
- *Helisoma duryi* (WETHERBY, 1879), the two species found first in the last ten years.

Melanoides tuberculata

Shell (Fig. 1: M) tall and pointed with whorls moderately convex. The sculpture is quite variable and consists of spiral ridges and, less developed, longitudinal ribs, visible more distinctly on older whorls, especially on their upper parts. Tubercular pattern is only slightly expressed (Fig. 1: M). The dimensions of snails living in their natural environment reaches up 45 x 17 mm, but usually are smaller (BROWN 1980). The results of measurements of 45 specimens taken from the Botanic Garden in Cracow are as follows:

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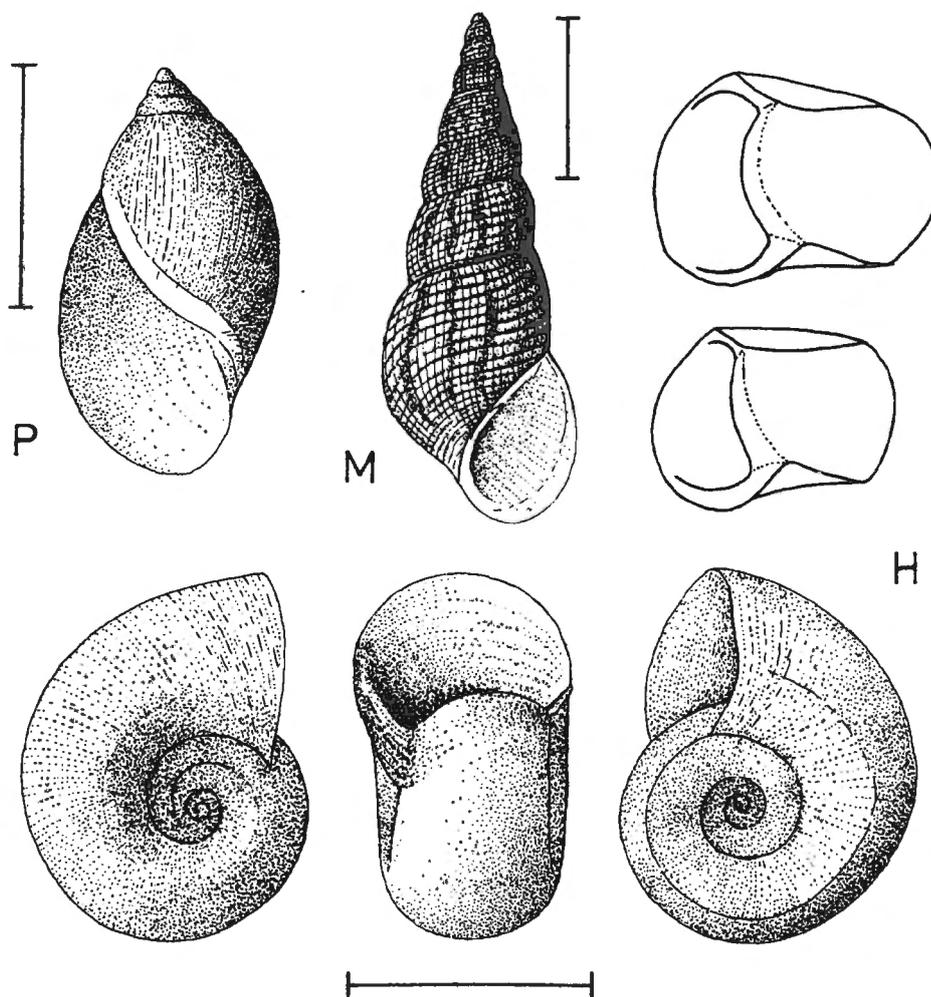


Fig. 1. Shells of water snails from the Botanic Garden in Cracow: P - *Physa acuta*, M - *Melanoides tuberculata*, H - *Helisoma duryi*, a bar equals 5 mm

	H_{mm}	B_{mm}	H/B	(H-D)/H
x (mean value)	15.80	5.05	3.09	0.710
x_{max} (largest shell)	26.37	7.96	3.31	0.720
x_{min} (smallest shell)	11.15	3.72	3.00	0.710
s (standard deviation)	0.37	0.11	0.14	0.010
b (standard error)	0.05	0.02	0.02	0.002
cv (variability index)	23.24	21.88	4.54	1.410

(H - height of the shell, B - breadth of the shell, D - height of the aperture).

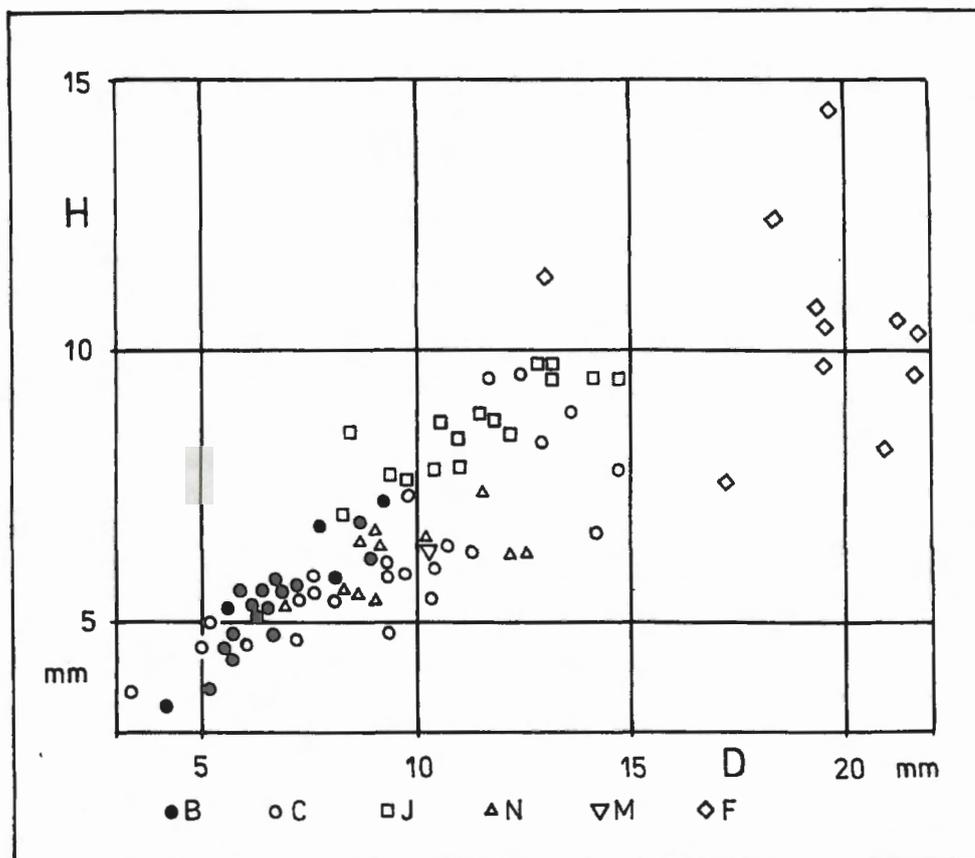


Fig. 2. Relation between shell height (H) and major diameter (D) of *Helisoma duryi*: B - Botanic Garden in Cracow, C - Cape Town (APPLETON 1977), J - Johannesburg (APPLETON 1977), N - Namibia (vanBRUGGEN 1974), M - Mandini (BROWN 1980), F - Florida (PILSBRY 1935)

The size of the largest specimen is nearly the same as in the shells described from the Margaret Island in Budapest (RICHNOVSKY & PINTER 1979). The species is eurytopic. It inhabits various water bodies like lakes and ponds, irrigation canals, small pools supplied by springs as well as shallow, slowly flowing waters. *M. tuberculata* occurs in Eastern and Southern Africa, in the Near East, South Asia and North Australia (BROWN 1980). It was also found in Turkmenia (ZADIN 1952) and in one locality in Spain (GASULL 1974). Outside from its natural range, the species was reported from a few greenhouses and hothouses in Europe, a.o. in Budapest, Bratislava and Piestany (FLASAR & KROUPOVA 1976), and is commonly kept in aquaria.

Helisoma duryi

Shell (Fig. 1: H) is broadly discoid in shape, small, slightly translucent with dense growth striae (10 - 12 per 1 mm). On the upper part of the whorls an angulate external margin is distinctly developed, while on the lower side of the shell the last whorl outline is rounded and markedly broadened. The umbilicus is large and quite deep (30 - 45% of the breadth and 70 - 80% of the height of the shell). The aperture is subangulate, about twice higher than broad. The upper surface of the shell is nearly flat or slightly sunken (Fig. 1: H). No specimen with the spire raised over the body whorl (scalarid shell) was found. The shape of shells exactly corresponds with the descriptions and figures of *H. duryi* (*H. duryi duryi*) published by PILSBRY (1935), VanBRUGGEN (1974) and APPLETON (1977), as well as with the ones of *Helisoma* sp. given by BROWN (1980: Fig. 101a). The dimensions of the largest specimen are 9.4 x 7.2 mm, while the most of the shells do not exceed 8 x 6 mm. The specimens found by the above authors were somewhat larger than the ones from Cracow (Fig. 2). *H. duryi* natural populations inhabit Florida, and are there rich and characterized by a considerable variability (PILSBRY 1935). The species was introduced to South Africa where it lives mainly in man-made water basins in towns and farms. It is also favoured by aquarists, who can promote its expansion.

Besides the water molluscs a few taxa of terrestrial snails were found in the largest hothouse of the Botanic Garden in Cracow. The occurrence of *Zonitoides arboreus* (SAY, 1816) is noteworthy especially. This is a species recorded from greenhouses in many towns of Europe (KERNEY, CAMERON & JUNGBLUTH 1983), e.g. in Czechoslovakia (FLASAROVA & FLASAR 1965, FLASAR & KROUPOVA 1976), but not known from Poland as yet. The remaining species, such as *Discus rotundatus* (O. F. MÜLLER, 1774), *Oxychilus draparnaudi* (BECK, 1837), *Cochlicopa lubrica* (O. F. MULLER, 1774), *Vitrea contracta* (WESTERLUND, 1871) and *Vallonia costata* (O. F. MÜLLER, 1774) occur commonly in natural habitats in Poland. The author will provide the continuation of study of the malacofauna of all the greenhouses of the Botanic Garden in Cracow.

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