

# *Hygromia cinctella* (Draparnaud, 1801) (Mollusca: Gastropoda: Hygromiidae), a New Snail Species for the Fauna of Bulgaria

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**Abstract:** The girdled snail *Hygromia (Hygromia) cinctella* (Draparnaud, 1801) is recorded for the first time from Bulgaria from the city area of Sofia. This species belongs to a genus that is newly recorded for the Bulgarian fauna, too. The species is considered as introduced to the country.

**Keywords:** *Hygromia cinctella*, Gastropoda, new record, Bulgaria

## Introduction

In the course of collecting samples in the city area of Sofia in autumn 2014, a snail belonging to a genus, hitherto not known to be a member of the Bulgarian malacofauna, was detected. *Hygromia cinctella* had not been found previously in Sofia regardless of the collecting efforts within the same region in previous years (2012-2013 – U. E. Schnepapat, F. Knechtle Glogger, I. K. Dedov).

The shell of *H. cinctella* is whitish-gray to horny-brown, slightly translucent, finely and rather regularly striated with 5-6 flattened whorls with shallow suture. Last whorl sharply keeled with a light spiral band at its periphery, emphasizing the keel. Aperture simple without lip inside. Fully-grown shells (diameter 10-12 mm) with narrow and almost covered by the reflected columellar margin umbilicus, not well-marked. Animals light-greyish or with yellowish hue, often with darker greyish or brownish head and neck (KERNEY *et al.* 1983, ŘIHOVÁ, JUŘIČKOVÁ 2011, WELTER-SCHULTES 2012). The Girdled Snail lives typically in open habitats, among low shrubs and herbs, often in small water currents or in river valleys and on river banks, in cool and humid habitats (Italy), cultivated habitats, rarely natural forests (Switzerland), road-sides, under stone

walls and in gardens (England and Switzerland), disturbed habitats and gardens of densely populated regions (Netherlands, Germany) (MIENIS 2006, 2008 a, GÖLLNITZ 2008, WELTER-SCHULTES 2012).

## Material and Methods

The materials were hand collected in autumn (September, October 2014) from the following localities:

Bulgaria, Sofia, neighbourhood Knayzhevo, Voivodina Mogila Street, along Vladayska River (Fig. 1 A-C). Specimens (spm.) of different age were detected: small juveniles, about half grown adults and adults.

1. N42.65757°, E023.23511°, 670 m, on *Ranunculus*, 19.X.2014, 2 spm., leg. I. K. Dedov.

2. N42.65741°, E023.23511°, 670 m, on *Clematis vitalba*, 19.X.2014, 1 spm., leg. I. K. Dedov; other gastropods on the spot: *Fruticicola fruticum* (O. F. Muller, 1774).

3. N42.65730°, E023.23462°, 671 m, on *Clematis vitalba*, 19.X.2014, 6 spm., leg. I. K. Dedov; other gastropods on the spot: *Helix lucorum* Linnaeus, 1758.

4. N42.656444°, E023.231525°, 675 m, synanthropic habitat, near a little bridge, *Urtica dioica*, *Syringa vulgaris*, *Clematis vitalba*, *Fallopia japonica*, *Artemisia vulgaris*, only little grass. Habitat heavily littered. 27–29.IX.2014: specimens were found almost exclusively on leaves of *Syringa vulgaris* (0.3–1.5 m above ground) with some attached to a nearby wall, leg. U. E. Schnepat and F. Knechtle Glogger, about 50 spm. (five adults in the collection of I. K. Dedov, Sofia, five adults in the collection D. Georgiev, Plovdiv); 13–14.X.2014, 11 spm. Other gastropods on the spot: *Deroceras cf. reticulatum* (O.F. Müller, 1774), *Deroceras cf. turcicum* (Simroth, 1894), *H. lucorum* Linnaeus, 1758, *Limacus flavus* (Linnaeus, 1758), *Limax* sp., *Tandonia kusceri* (H. Wagner, 1931).

## Results and Discussion

### Distribution

According to the IUCN Red List of Threatened Species (version 2014), originally *H. cinctella* occurs in the following countries (from west to east): Spain (mainland); France (Corsica, mainland); Italy (mainland, Sicily); Slovenia; Croatia. Other authors mention: SE France, Sardinia, Corsica, Italy including Sicily (CIANFANELLI, LORI 2007, HALLGASS, VANNOZZI 2014, <http://animalbase.org/>), Slovenia, NW Croatia (ŠTAMOL, KLETEČKI 2005, BECKMANN, KOBIALKA 2008, ŠTAMOL 2010, <http://animalbase.org/>), Bosnia and Herzegovina, NW Serbia and Hungary (KERNEY *et al.* 1983, BECKMANN, KOBIALKA 2008, <http://animalbase.org/>). It is likely that the natural range of the species reaches NE Spain (GRAELLS 1846, BROS 2006,

<http://animalbase.org/>).

The species was firstly recorded from NW France in the 1940s and spread rapidly, today almost in the entire country (DEFOSSEZ, MAURIN 1995, WELTER-SCHULTES 2012, <http://animalbase.org/>). The species is also considered to be introduced (in chronological order) to France, Pyrenees-Atlantiques (PRIETO, PUENTE 1992) in the outermost southwestern part of the country as well as in South Tyrol, Italy (KIERDORF-TRAUT 2006); to England, Cornwall before 1950 with nurseries or garden plants (COMFORT 1950), and still spreading rapidly, reaching Devon and the London area (the IUCN Red List of Threatened Species, <http://animalbase.org/>). *Hygromia cinctella* was also introduced to Austria about 1978 (STOJASPAL 1978, KERNEY *et al.* 1983, REISCHÜTZ 2005, BECKMANN, KOBIALKA 2008, FISCHER 2010, DUDA, MRKVICKA 2014), Germany (WIMMER 2006, BECKMANN, KOBIALKA 2008, GÖLLNITZ 2008, ROSENBAUER 2011), the Netherlands (BOESVELD 2005, MIENIS 2006, 2007, 2008 b, 2010, 2012, 2014, VAN DER VELDE, KLOK 2013, VAN DER VELDE *et al.* 2014, BECKMANN, KOBIALKA 2008), Belgium (JACOBS, HANSEN 2009, VAN DEN NEUCKER, SCHEERS 2014), Ireland (PREECE 2005, BECKMANN, KOBIALKA 2008), Scotland (WEDDLE 2009), the Czech Republic (ŘÍHOVÁ, JUŘÍKOVÁ 2011).

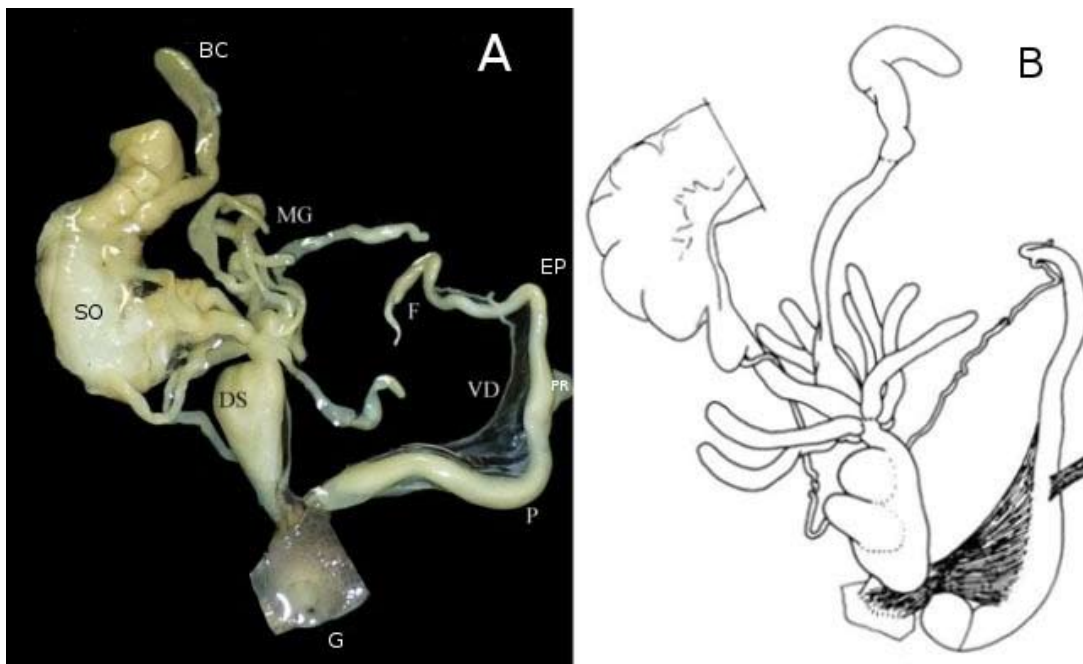
In Switzerland the species has rapidly spread over the last decades (BEAT 2007, BECKMANN, KOBIALKA 2008). Our unpublished observations show that in Switzerland *H. cinctella* has reached sites of much higher altitude than in almost any other parts of Europe (Grisons, Tinizong-Rona, 2009, 1250 m, CSCF; Grisons, Bergün-Bravuong, 2008, 1360 m,



**Fig. 1.** Habitats of *Hygromia cinctella* along river Vladayska River, Sofia city area, Bulgaria. A - localities № 1 and 2, B - locality 3, C - locality 4.



**Fig. 2.** External view of adult Bulgarian specimens



**Fig. 3.** Sexual system of *Hygromia cinctella*. A – Bulgarian specimen, photo; B – after Prieto and Puente 1992, Fig. 13. Abbreviations: G – genital pore; ♂: P – penis, PR – penial retractor, EP – epiphallus, F – flagellum, VD – Vas deferens; ♀: DS – dart sac, MG – mucus glands, SO – spermoviduct, AG – albumen gland; BC – bursa copulatrix

CSCF; Grisons, Churwalden-Malix, 2004, 1240 m, private data US-BNM; Ticino, Fusio, 2013, 1300 m, CSCF; Valais, Icoigne, 2003, 1020 m, CSCF; Valais, Saint-Martin, 2012, 1400 m, CSCF). Further, the spread of the species has happened independently of the substrate quality. For example in Canton Ticino, Southern Switzerland, all populations were found on sour substrate with granites and gneisses.

In Bulgaria, we found *H. cinctella* also in non-limestone areas. Currently, its Bulgarian population is by far the easternmost known locality of the species in Europe. Considering the wide and rapid spread of *H. cinctella* in Europe as a result of introductions, their recent finding and spot-distribution in Bulgaria, we consider the occurrence of *H. cinctella* as a new introduction and, therefore, this is an al-

ien species for the Bulgarian fauna. Its introduction probably happened with the importation of garden plants as the region of the valley of the Vladayska River is very rich of gardens.

### Habitat

The Bulgarian population of the species was found in and around gardens along the Vladayska River (Fig. 1) in overbuilt, synanthropic and partly polluted habitats with herbaceous and shrub vegetation. Such type of habitat is typical for other European populations of the species (MIENIS 2006, 2008 a, GÖLLNITZ 2008, WELTER-SCHULTES 2012). For accompanying plant and gastropod species, see Material and Methods.

### Morphology

The shell of the Bulgarian population of *H. cinctella* shows typical characters of the species – from whitish-grey to horny-brown, slightly translucent. The last whorl is weakly keeled. The aperture is simple, without lip inside. The size of the fully-grown specimens corresponds to the typical size with largest diameter of 10-12 mm. Animals vary from yellowish to light-greyish, often with darker greyish or brownish head and neck (Fig. 2 A – C; KERNEY *et al.* 1983, ŘÍHOVÁ, JUŘIČKOVÁ 2011, WELTER-SCHULTES 2012, present work).

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DUDA M., A. MRKVIČKA 2014. Zur Ausbreitung der Neozoen *Monacha cantiana* (MONTAGU 1803), *Hygromia cinctella* (DRAPAR-

### Anatomy

The anatomy of the Bulgarian specimens corresponds to the anatomy of the species given by GITTENBERGER (1970) and PRIETO, PUENTE (1992). Male: Penis and epiphallus well developed and long, separated by wide penial retractor. Penis not much wider than epiphallus, flagellum relatively short. Female: Dart sac with two lobes (not always very prominent in some specimens). Mucus glands eight, relatively long. Spermatophore-receiving organ very long, without clearly separated bursa copulatrix (Fig. 3 A-B). The shape of the love-darts in the Bulgarian specimens are like in Fig. 17 in PRIETO, PUENTE (1992) and KOENE, SCHULENBURG (2005). According to GITTENBERGER (1970), the love-darts of *H. cinctella* show clearly two apical crests. He believed that this feature was very characteristic among the species in the genus, but was not found by PRIETO, PUENTE (1992), neither by KOENE, SCHULENBURG (2005), nor for the love dart structures in the specimens found in Sofia, Vladayska River.

**Acknowledgements:** The study was supported by the Financial Mechanism of the European Economic Area 2009-2014, Programme BG03 Biodiversity and Ecosystem Services, within the project ESENIAS-TOOLS, D-33-51/30.06.2015.

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Received: 18.03.2015

Accepted: 03.06.2015

