

New localities of *Stagnicola turricula* (Held, 1836) in Poland (Gastropoda: Pulmonata: Lymnaeidae)

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Abstract. Living specimens of *Stagnicola turricula* (Held, 1836) were collected from four different sites in the drainage ditch in Odrzykoń near Krosno (south-eastern Poland). This is the third locality of the species known from Poland. Biometrical analysis of the collected material was carried out. The analysis of variance (one-way ANOVA) showed no significant difference in the shell height between the samples from different sites.

Kurzfassung. Neue Fundorte von *Stagnicola turricula* (Held, 1836) in Polen (Gastropoda: Pulmonata: Lymnaeidae). Lebende Exemplare von *Stagnicola turricula* (Held, 1836) wurden an vier verschiedenen Stellen in einem Entwässerungsgraben in Odrzyko nahe Krosno (Südost-Polen) gesammelt. Dies ist der dritte bekannte Fundort dieser Art in Polen. Eine biometrische Analyse des gesammelten Materials wurde durchgeführt. Die Varianzanalyse (ANOVA) zeigte keinen signifikanten Unterschied in der Gehäusegröße der einzelnen Proben.

Key words. *Stagnicola turricula*, drainage ditch, biometrical analysis, Poland.

Introduction

According to JACKIEWICZ (1997a, 1997b, 1998) the list of European *Lymnaeidae* includes 11 species distinguished on the basis of anatomical structure of their reproductive system. Alongside two other species, *Lymnaea turricula* (Held, 1836) is assigned to the subgenus *Stagnicola* Leach, 1830 (JACKIEWICZ 2000). On the other hand, some authors assigned *S. turricula* to the genus *Stagnicola* Jeffreys, 1830 (FALKNER et al. 2001; BANK et al. 2001). The analysis of DNA nucleotide sequences of *Stagnicola turricula*, *S. palustris* (O. F. Müller, 1774) and *S. occulta* (Jackiewicz, 1959) by means of RAPD technique (RYBSKA et al. 2000) confirmed the status of these species.

On the other hand, some authors (BARGUES et al. 2001) based on nuclear ribosomal DNA ITS-2 sequences suggest, that *S. turricula* may not be considered a species distinct from *S. palustris*.

Until now, *S. turricula* was found in Germany (HELD 1836; FALKNER 1986; BELLSTEDT 1994; ZEISSLER 1999), the Czech Republic, the Slovak Republic, Hungary, Austria, Bulgaria and in Poland (JACKIEWICZ 1997a; FALKNER et al. 2001). In Poland, species was reported from Brzezina Polska near Nysa and the Bieszczady Mountains (four sites) in the 1970s and 1980s (JACKIEWICZ 1988b, 1997a) (Fig. 1). This investigation adds one more locality completing the literature data concerning the distribution and ecology of *S. turricula*.

Material and methods

Material for the quantitative studies was collected in September 2001, by means of routine malacological methods. Living specimens were found in four different sites in a drainage ditch at depth of 20 cm located in Odrzykoń near Krosno (south-eastern Poland) (Fig. 1, loc. 6). The samples were taken from the muddy bottom. The species of *Lymnaeidae* were identified and classified according to JACKIEWICZ (1998, 2000).

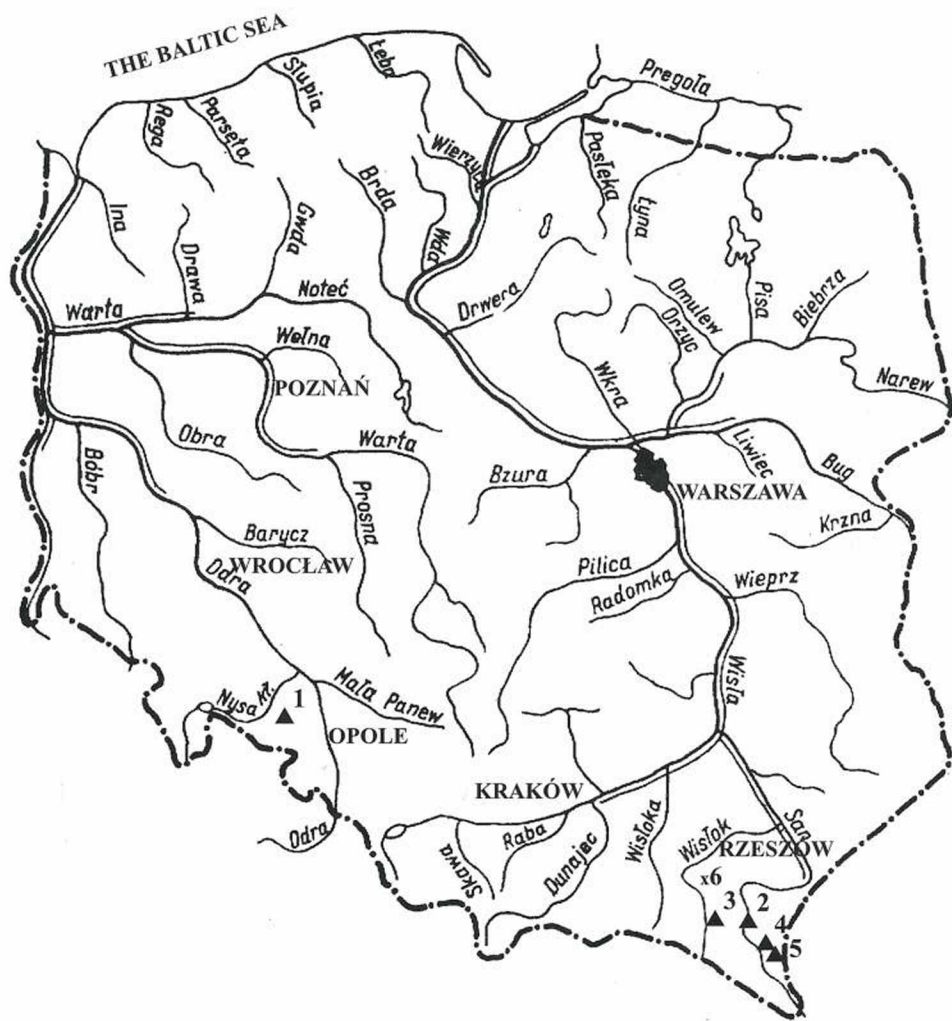


Fig. 1. Localities of *Stagnicola turricula* (Held, 1836) in Poland. Localities: 1. Brzezina Polska near Nysa: 05.06.1963 (3 specimens), leg. A. Wiktor, det. M. Jackiewicz (Jackiewicz, M. 1988), 2. The San near Lesko: 05.07.1977 (16 specimens), det. M. Jackiewicz (Jackiewicz, M. 1988), 3. The Strumień in Cisna: 06.07.1977 (27 specimens), det. M. Jackiewicz and 1978 (14 specimens), det. I. Odrzykowski (Jackiewicz, M. 1988), 4. Stawek near Ustrzyki Dolne: 07.07.1977 (13 specimens), det. J. Błoszyk (Jackiewicz, M. 1988), 5. The ditch near Ustrzyki Dolne: 07.07.1977 (4 specimens), det. M. Jackiewicz (Jackiewicz, M. 1988), 6. The drainage ditches in Odrzykoń near Krosno: 22.09.2001 (172 specimens), leg. J. Cebula, det. I. Lewin.

The biometrical analysis of collected *S. turricula* specimens was carried out. Correlation between their shells height and width as well as between their aperture height and width was calculated by means of the Product Moment Correlation Coefficient r . Estimation of the shell height variation in the samples of *S. turricula* from the four different sites was performed by means of the one-way ANOVA („Statistica for Windows, version 5.0”).

Tab. 1. The percentage of gastropod species in the samples collected in four sites in a drainage ditch of location 6 (see Fig.1.).

Sites	Site 1	Site 2	Site 3	Site 4
Species				
<i>Radix peregra</i> (O. F. Müller, 1774)	87,65	40,78	53,74	73,64
<i>Stagnicola turricula</i> (Held, 1836)	6,79	55,82	17,0	16,28
<i>Anisus spirorbis</i> (Linnaeus, 1758)	3,70	3,40	29,25	10,08
<i>Aplexa hypnorum</i> (Linnaeus, 1758)	1,85	-	-	-

Tab. 2. Descriptive statistics of *S. turricula* shell measurements in the samples collected in four sites in a drainage ditch (n=172) of location 6 (see Fig. 1).

	Variable	Mean	Minimum	Maximum	Std. Dev.
Site 1 n=11	Shell height	9,67	7,10	15,20	2,39
	Shell width	4,21	3,30	6,40	0,91
	Aperture height	4,88	3,90	7,30	1,02
	Aperture width	3,02	2,20	4,30	0,58
Site 2 n=115	Shell height	10,26	4,60	17,20	3,23
	Shell width	4,58	2,10	7,30	1,21
	Aperture height	5,26	2,60	8,0	1,43
	Aperture width	3,02	1,30	5,10	0,91
Site 3 n=25	Shell height	10,94	4,20	17,0	3,25
	Shell width	4,74	2,10	6,50	1,18
	Aperture height	5,38	2,80	7,40	1,31
	Aperture width	2,97	1,10	4,10	0,72
Site 4 n=21	Shell height	9,90	4,90	17,80	4,22
	Shell width	4,28	2,50	6,80	1,44
	Aperture height	4,84	2,60	8,40	1,72
	Aperture width	2,93	1,20	4,70	1,12

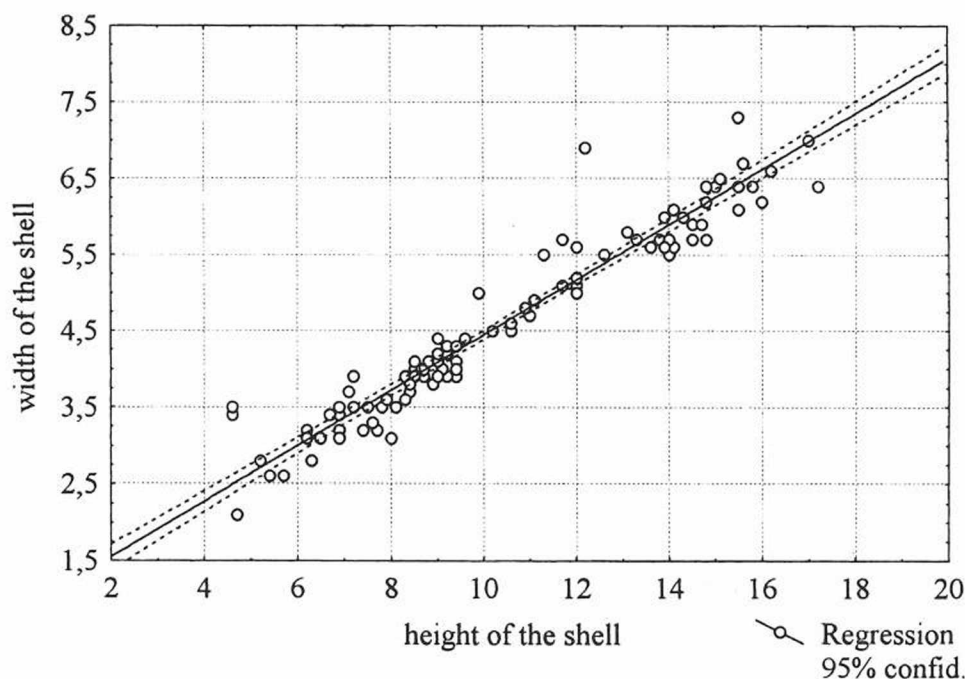


Fig. 2. Correlation between the height and width of *Stagnicola turricula* shell ($r=0,96$).

Results

The total amount of 172 specimens of *S. turricula* was collected together with three other species from the four sites described above. The percentage of *S. turricula* in the samples varied from 6,79 % (site 1) to 55,82 % (site 2) (tab. 1).

The height of *S. turricula* shells varied from 4,2 mm (site 3) to 17,8 mm (site 4) and their width from 2,1 mm (sites 2, 3) to 7,3 mm (site 3) (tab. 2).

The analysis of the Products Moment Correlation Coefficient r shows a strong positive correlation between the shells height and width ($r=0,96$, $p<0,05$, $n=115$) (Fig. 2) as well as between their aperture height and width ($r=0,92$, $p<0,05$, $n=115$).

The analysis of variance (one-way ANOVA) showed, that the variation in the shells height between the four samples was not significantly higher than the variation within each samples. The ratio of the praeputium length to the penis sheath length specimens of *S. turricula* collected from the drainage ditch Odrzykon near Krosno was 1:3. The penis sheath was as long and thin as vas deferens (Fig. 3).

Discussion

S. turricula was described on the basis of shell characters by HELD (1836). The type locality is in Bavaria.

The maximum height of *S. turricula* shells found by FALKNER (1985) in Germany was 16,7 mm and their width was 7,3 mm. The ratio of the praeputium length to the penis sheath length of specimens found in Drösing was up to 1:2,95. Measurement of the same structure in our specimens from Odrzykoń were similar.

According to JACKIEWICZ (1988b) the maximum height of *S. turricula* shells collected in Poland was 24 mm and their width was up to 9 mm. The specimens were collected from the lentic and lotic systems of the Strumień and the San. The data on shell morphometry

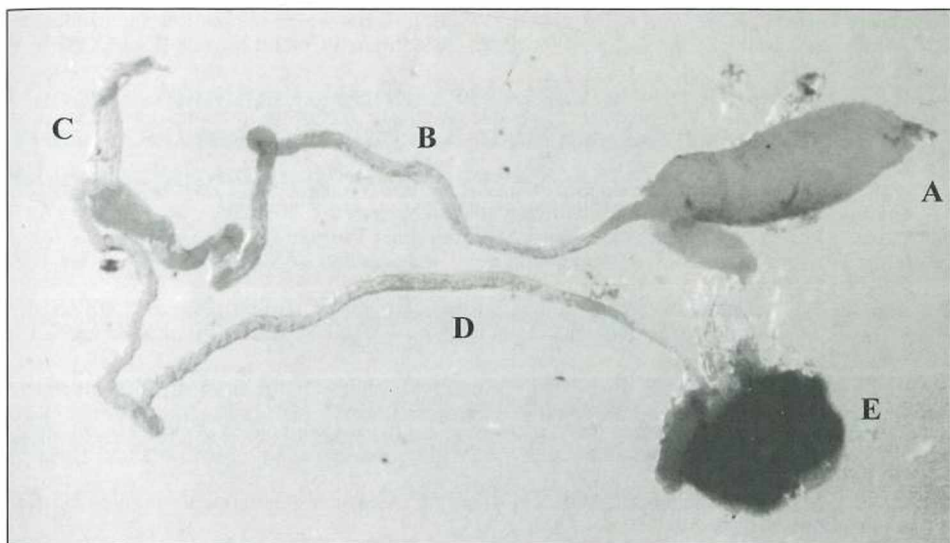


Fig. 3. The characteristic features of the reproductive system. A – praeputium, B – penis sheath, C – retractor of the penis sheath, D – vas deferens, E – prostata.

and habitats presented here well agree with literature data for the other Polish localities. Relatively low variation of the shell height between the samples of *S. turricula* from four different sites in the study area suggests that all samples belong to one population. Estimation of variation parametres of shells collected in other localities was not carried out. The results of our anatomical investigation also well agree with the data provided by JACKIEWICZ (1996, 1997a, 2000) and confirm taxonomic significance of the reproductive system characters shown by earlier studies on *Lymnaeidae* (ROSZKOWSKI & ŻEBROWSKA (1915), WAGNER (1929), FALKNER, 1985, JACKIEWICZ (1988a, 1989). According to JACKIEWICZ (1988b), *S. turricula* and *S. palustris* can be reliably distinguished only on the basis of their reproductive system structure. One of the characteristic features of *S. turricula* reproductive system is the ratio of the praeputium length to the penis sheath length.

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