

New records of *Testacella scutulum* Sowerby, 1821 and *Paralaoma servilis* (Shuttleworth, 1852) (Gastropoda: Pulmonata: Testacellidae et Punctidae) from Istria, Kvarner and Dalmatia (Italy, Slovenia and Croatia)

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Abstract. Recent collecting in Istria, Kvarner and Dalmatia has yielded new data about the presence of *Testacella scutulum* Sowerby, 1821 and *Paralaoma servilis* (Shuttleworth, 1852). The author provides ecological and anatomical remarks and an updated map of their distribution.

Kurzfassung. Neue Nachweise für *Testacella scutulum* Sowerby, 1821 und *Paralaoma servilis* (Shuttleworth, 1852) (Gastropoda: Pulmonata: Testacellidae et Punctidae) aus Istrien, Kvarner und Dalmatien (Italien, Slowenien und Kroatien). – Kürzlich durchgeführte Aufsammlungen in Istrien, Kvarner und Dalmatien lieferten neue Verbreitungsangaben für *Testacella scutulum* Sowerby, 1821 und *Paralaoma servilis* (Shuttleworth, 1852). Der Autor macht ökologische und anatomische Anmerkungen und erstellt eine aktualisierte Verbreitungskarte beider Arten.

Key words. Testacellidae, *Testacella scutulum*, Punctidae, *Paralaoma servilis*, distribution, ecology, anatomy, Italy, Slovenia, Croatia.

Introduction

The distribution of small and “hard-to-find” species is still poorly known in Istria, Kvarner and Dalmatia. Although recent contributions provided thorough faunistic lists for particular localities, (see KITTEL 2002; ŠTAMOL 1986; ŠTAMOL 2004; ŠTAMOL & KLETEČKI 2005; ŠTAMOL & SLAPNIK 2002; ŠTAMOL & VELKOVRIH 1995), large portions of these territories still lack satisfactory faunistic data (JAECKEL et al. 1957). In one of these papers (ŠTAMOL 2004), particular remarks have been made about the presence and distribution of two interesting species along the eastern Adriatic coast: *Testacella scutulum* Sowerby, 1821 and *Paralaoma servilis* (Shuttleworth, 1852). The distribution of these species is still poorly known and currently represented by few scattered localities (ŠTAMOL 2004: 108).

The author, during recent collecting activities in Istria, Kvarner and Dalmatia, obtained new distribution data for both these species. This paper aims to provide some ecological and anatomical remarks and an updated map of their distribution.

Material and methods

All the material was collected by the author. Field activity aimed at large and medium-sized species was combined with laboratory sorting of leaf litter and river debris. All *T. scutulum* specimens were relaxed in water and then preserved in 75% ethanol. Live-collected specimens and empty shells of *Paralaoma* and shells of *Testacella* were kept dry. The material is deposited in the author's private collection. The morphological and anatomical examinations, photographs and drawings were made with an Olympus SZX-9 stereomicroscope and Olympus SZX-DA camera lucida.

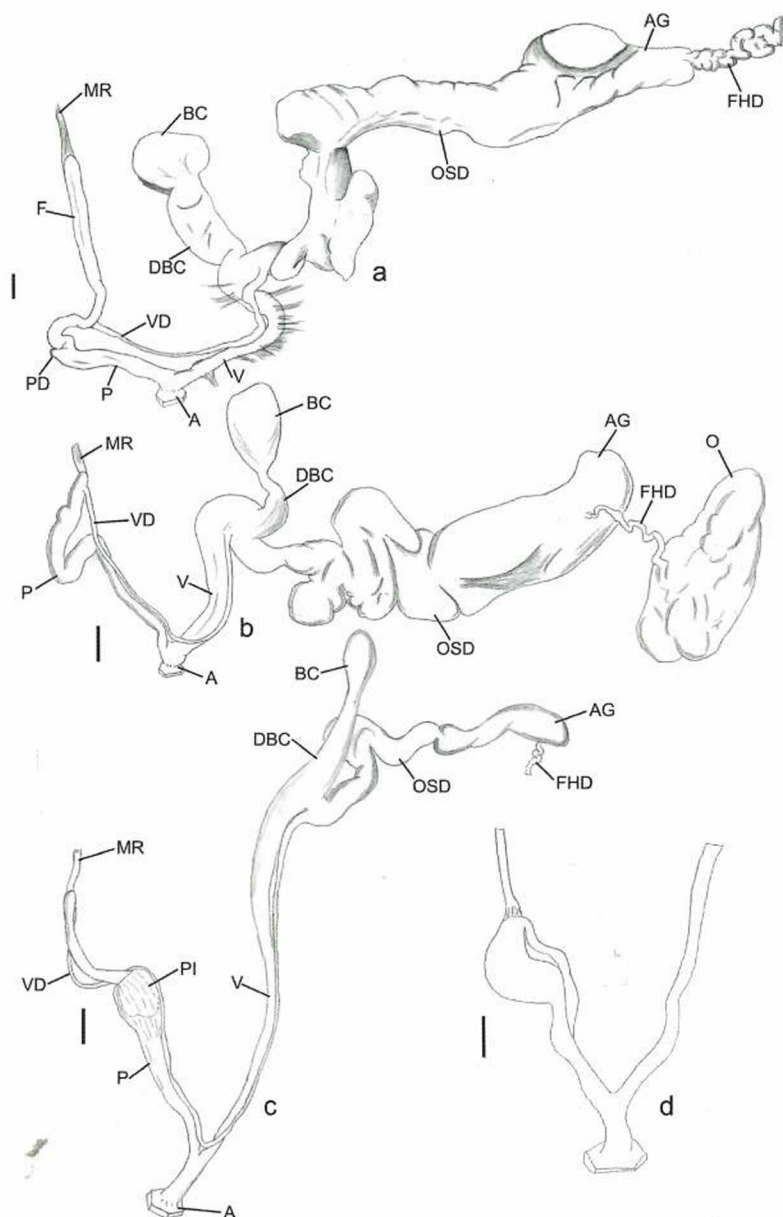


Fig. 1. **a)** *Testacella haliotidea* Draparnaud, 1801 from Collina di Cavoretto (Torino, Piemonte, Italy). 25 August 2002. Niero leg. Whole genitalia, excluding gonad. **b)** *Testacella scutulum* Sowerby, 1821 from Sečovlje, Istria, Slovenia. Whole genitalia. **c)** *T. scutulum* from Veli Lošinj, Kvarner, Croatia, close to the old cemetery. Whole genitalia. **d)** *T. scutulum* from Pelegrin, Istria, Croatia. Distal male genitalia. Anatomical acronyms: A atrium; AG albumen gland; BC bursa copulatrix; DBC duct of the bursa copulatrix; F flagellum; FHD first hermaphrodite duct; P penis; PD penial diverticulum; PI penial invagination; O ovotestis (or gonad); OSD ovispermiduct; PR penial retractor muscle; V vagina; VD vas deferens. All scale-bars: 1 mm.

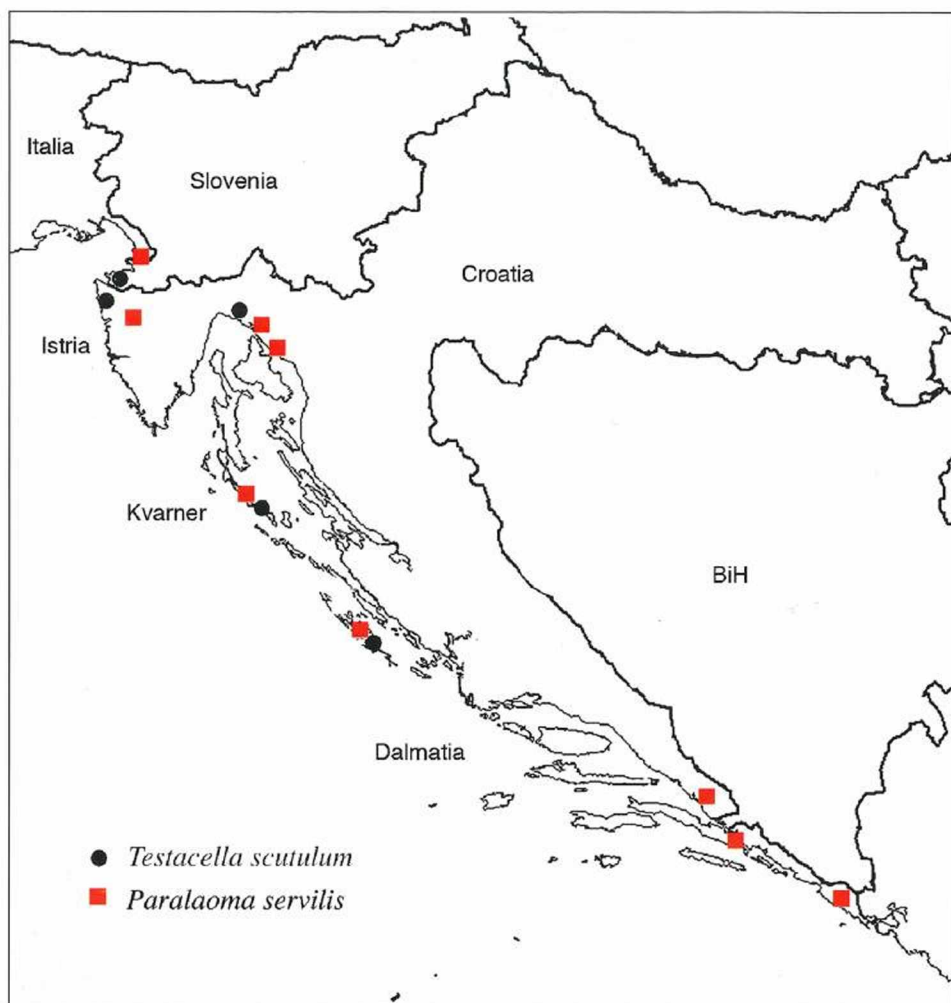


Fig 2. Distribution of *Testacella scutulum* Sowerby, 1821 (dots) and *Paralaoma servilis* (Shuttleworth, 1852) (squares) in Istria, Kvarner and Dalmatia.

***Testacella scutulum* Sowerby, 1821**

- Istria: Sečovlje, municipality of Piran, Slovenia. 45°27'N 13°37'E. Under cardboard panels in a field close to the Slovenian-Croatian border crossing of Sečovlje-Dragonija, 2 m a.s.l., 22 March 2000, 3 specimens. Fig. 1b.
- Istria: Pelegrin, 5 km S of Umag, municipality of Umag, Istarska Zupanija, Croatia. 45°24'N 13°31'E. Near the church of San Pellegrino, under stones close to rocky shore. 2 m a.s.l., 18 April 1999, 2 specimens. Fig. 1d.
- Kvarner: Veli Lošinj, island of Lošinj, Rijeka, Primorsko-Goranska Zupanija, Croatia. 44°31'N 14°30'E. Under stone close to the old cemetery, 20 m from coastal cliffs, 10 m a.s.l., 14 April 2001, 1 specimen. Figs. 1c and 3a.
- Kvarner: Veli Lošinj, island of Lošinj, Rijeka, Primorsko-Goranska Zupanija, Croatia. 44°31'N 14°30'E. In litter collected behind the church of Velj Losinj. 15 m a.s.l., 14 April 2001, 1 shell. Fig. 3b.

The genus *Testacella* has an Euro-Mediterranean-Macaronesian distribution. *T. scutulum* is present in Western Europe (FALKNER 1990), in the Italian Peninsula and Sicily (ALZONA 1971; DE MATTIA 2003; RINALDI 2003). This species, as shell, is hardly distinguishable from *T. haliotidea* Draparnaud, 1801, which is also widely distributed in Western Europe and the British Isles (QUICK 1960). The presence of a long penial flagellum and a short penial caecum in *T. haliotidea* (Fig. 1a) which are absent in *T. scutulum*, clearly discriminates the two taxa (GIUSTI et al. 1995: 322). JAECKEL et al. (1957: 155) cited both species for Istria and Dalmatia. In Croatia, *T. scutulum* has been reported from Fiume (Rijeka) (WAGNER, 1952) and the Telašćica Nature Park (Dugi Otok) (ŠTAMOL 2004; conchologically identified, ŠTAMOL personal communication, 12 May 2005). In Slovenia, both *T. haliotidea* and *T. scutulum* have been reported by BOLE & SLAPNIK (1998: 122) from "Submediterranes Gebiet". In spite of the careful collecting carried out by ŠTAMOL & VELKOVHRH (1995) in Veli Lošinj, these authors failed to find *T. scutulum*, probably because of its subterranean lifestyle and the (presumed) low population density. No anatomical data or remarks have been given by any of these authors, leading to confusion about the presence and the distribution of both species.

During the present study, all specimens were investigated anatomically. While the presence of *T. haliotidea* has still to be proved, this paper represents the first anatomical confirmation for *T. scutulum* from Istria and Kvarner. The penis of the specimen from Veli Lošinj shows a partial invagination, while the outer penial walls show a longitudinal streaking. The bursa copulatrix, the ovispermiduct and the albumen gland show a strong hypotrophy (Fig. 1c). The female portion of genitalia, being not fully developed, undoubtedly implies a subadult specimen.

The specimens from Sečovlje and Pelegrin (Figs. 1b and 1d) show fully developed genitalia, each with a well developed bursa copulatrix, ovispermiduct and albumen gland. The vagina is remarkably short and large (Fig. 1b). These specimens were in the mature and full-grown life-cycle stage.

Fig. 2 shows the distribution of *T. scutulum* in Istria, Kvarner and Dalmatia.

Paralaoma servilis (Shuttleworth, 1852)

– Istria: Muggia, Trieste, Friuli-Venezia Giulia, Italy. 45°35'N 13°47'E. In debris near the mouth of the stream Ospo, 0 m a.s.l., 12 December 2004, 6 shells.

– Kvarner: Bakarac, municipality of Bakar, Rijeka, Primorsko-Goranska Zupanija, Croatia. 45°16'N 14°34'E. Amongst vegetation along the dried-up stream bed, near the bridge. 0 m a.s.l. 18 December 2004. 18 live specimens and 36 shells. Fig. 3c.

– Dalmatia: Neretva estuary near Komin, Metković, Dubrovačko-Neretvanska Zupanija, Croatia. 43°02'N 17°32'E. Debris along riverside, 0 m a.s.l. 3 January 2005, 4 shells. Fig. 3e.

– Dalmatia: Ston, Pelješac peninsula, Dubrovnik, Dubrovačko-Neretvanska Zupanija, Croatia. 42°50'N 17°41'E. Debris along the stream, 0 m a.s.l. 4 January 2005, 6 shells. Fig. 3d.

P. servilis has a wide distribution covering most of Europe. It is known to be present in Great Britain, The Netherlands, Germany, Spain, Azores, Madeira, Canary Islands, France, Italy and Greece. It is also present in Africa (Algeria, Morocco and Cape Verde), in Asia (Turkey and Saudi Arabia) and in North America (USA, including Alaska). Because *P. servilis* is easily dispersed by human activities, it is impossible to establish its original distributional range (SCHMID 2002: 377; SCHÜTT 2001: 160).

So far, in Croatia the species was known from Telašćica (ŠTAMOL 2004), Motovun (MAASSEN 1993), Veli Lošinj (ŠTAMOL & VELKOVHRH 1995), Crikvenica and Novi (MAASSEN 1984), and Konavle in Ljuta valley (REISCHÜTZ & REISCHÜTZ 2002). The present note adds three more localities along the Croatian Adriatic coast. The findings from Komin and Ston partially fill the large distributional gap between the southernmost locality (Konavle) and the northern

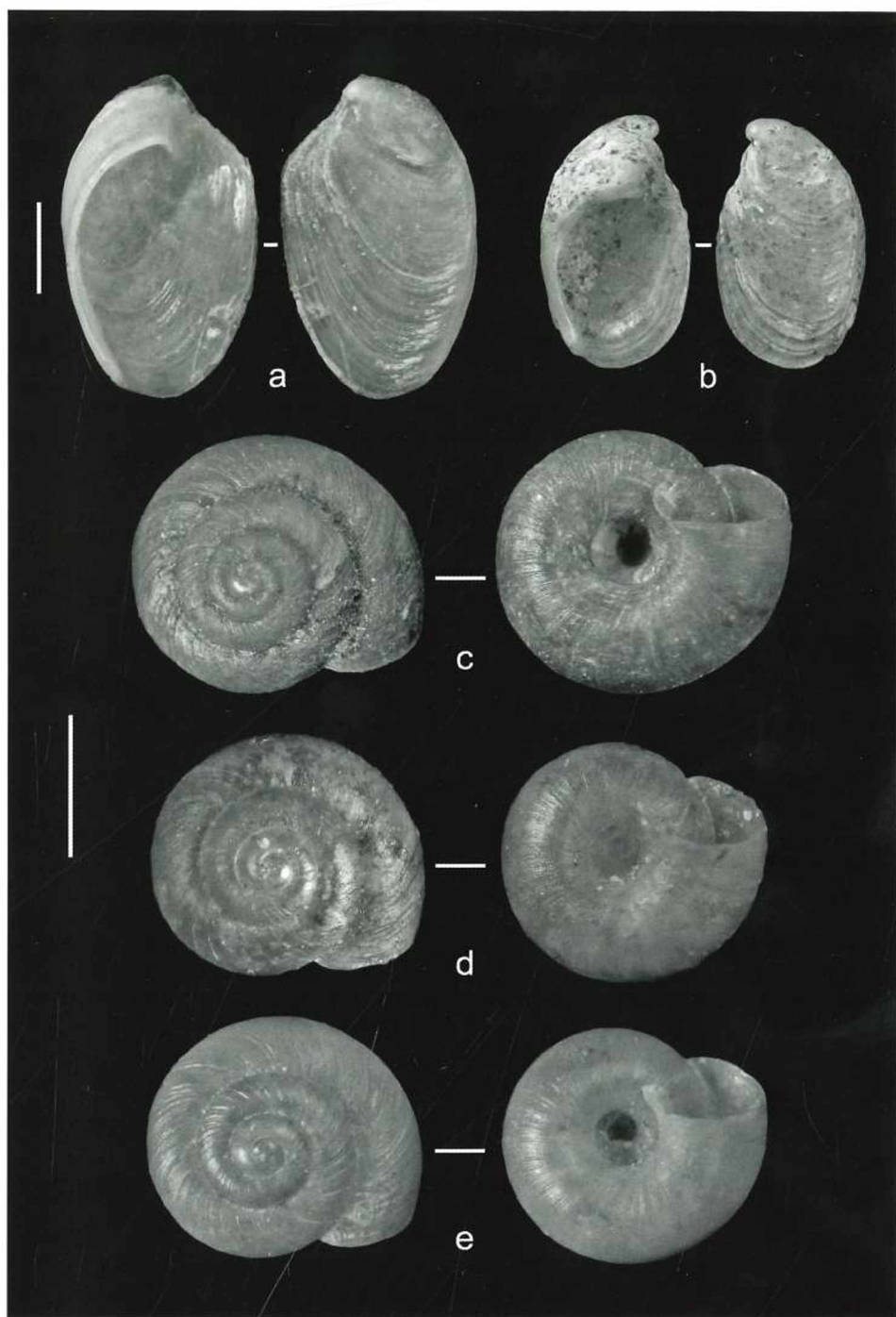


Fig. 3. **a)** *Testacella scutulum* from Veli Lošinj, Kvarner, Croatia, close to the old cemetery. Shell. **b)** *T. scutulum* from Veli Lošinj, Kvarner, Croatia, behind the church. Shell. **c)** *Paralaoma servilis* from Bakarac, Kvarner. **d)** *P. servilis* from Ston, Dalmatia. Shell. **e)** *P. servilis* from Neretva estuary, Dalmatia. All scale-bars: 1 mm.

occurrences (the most southern of which is Telašćica) thus suggesting a wider presence of the species along the Adriatic coast. The finding from Muggia represents the second record for the Istrian peninsula. *P. servilis* has never been found in the Istrian territory belonging to Slovenia (BOLE & SLAPNIK 1998). This is probably due to its small size and cryptic habit. Very little is known about the ecology of this species; however, it seems to prefer humid habitats close to stream beds, rivers and lakes. Fig. 2 shows the distribution of *P. servilis* in Istria, Kvarner and Dalmatia.

Discussion

Bearing in mind the presumable improbability of passive transport by man (GIUSTI et al. 1995), populations of *T. scutulium* in Istria, Kvarner and Dalmatia are believed to be native. Probably, the Pleistocene periods of marine regression, related to ice-age phenomena, allowed the colonization of the Adriatic Islands by temperate and alpine species (ŠTAMOL & POJE 1998). Subsequent strong climatic changes into mediterranean conditions, caused the extinction of most of these immigrants. Nevertheless, taxa such as *T. scutulium* have been able to survive in appropriate microhabitats, resulting in the current patchy distribution.

The new data about *P. servilis* clearly show that the species, even though patchily distributed, probably occurs right along the Adriatic coast. For this species, its ecological characteristics are far from completely known and passive transport by man cannot be excluded.

The conservation status of, and the threats to, both taxa cannot be accurately estimated owing to the patchy distribution. Anyway, as stated in ŠTAMOL (2004), sites where the species are known to be present should be protected, mainly against habitat destruction.

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