

A new *Mediterranea* species from a montane habitat in Turkey (Gastropoda, Pulmonata, Oxychilidae)

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A land snail extracted from rotting wood in a pine forest at an altitude of 1350 m on the noncalcareous Sandras Mountain in western Turkey is described as a new species, *Mediterranea xylocola* Örstan spec. nov. Besides its unusual habitat, the new species is also characterized by its small shell (~4 mm in diameter) microsculptured with distinct spiral striae.

Key words: Gastropoda, Pulmonata, Oxychilidae, genitalia, radula, *Oxychilus*, *Mediterranea*, Turkey

INTRODUCTION

Having surveyed for land snails in Turkey for many years, we can generalize safely that in the southwestern regions of the country land snails are often diverse and abundant in calcareous habitats, but poor both in diversity and abundance in noncalcareous areas. Consequently, to maximize the numbers of species and specimens collected in a given amount of time, land snail surveys are usually conducted in calcareous areas, while potential habitats that may exist in areas with noncalcareous rocks are often neglected.

Sandras is a forested mountain in the Provinces of Muğla and Denizli in southwestern Turkey. The geological map of the area (Konak & Şenel, 2002), shows no calcareous outcrops on the mountain where the most common rock type is serpentinite. During a brief survey conducted on Sandras Mountain in the summer of 2006, we indeed encountered a depauperate land snail fauna; however, three specimens that were found turned out to be of an undescribed species that we are describing here as new.

MATERIALS AND METHODS

Shell height (H) and diameter (D) were measured under a stereomicroscope. Whorls were counted along the suture. The radula was extracted by macerating the buccal tissues in ~25% KOH. The cleaned radula was mounted in glycerine jelly and photographed using a compound microscope equipped with differential interference contrast. The photographs obtained at different focus levels were stacked to obtain a composite image. The genitalia were photographed under a stereomicroscope and the individual organs were measured on photographs using ImageJ (<https://imagej.nih.gov/ij/>). Because the penis of the dissected specimen was so narrow (~0.13 mm), we could not cut it open directly and instead, first, softened the tissues in ~25% KOH, and then teased open the penis wall using mounted very fine minutien pins. In the description of the genitalia, distal and proximal are with respect to the ovotestis.

SYSTEMATIC PART

Superfamily Gastrodontoidea Tryon, 1866

Family Oxychilidae P. Hesse, 1927 (1879)

Subfamily Oxychilinae P. Hesse, 1927 (1879)

Genus *Mediterranea* Clessin, 1880

Type species (designated by Forcart, 1957: 121): *Helix hydatina* Rossmässler, 1838.

***Mediterranea xylocola* Örstan spec. nov.**

(Figs 2-6)

Type series. — The holotype (shell only) (CM173500) and one paratype in alcohol (CM173501) have been deposited in the Carnegie Museum of Natural History, Pittsburgh, PA, U.S.A. A dissected paratype and its extracted genitalia and radula are in the collection of the author.

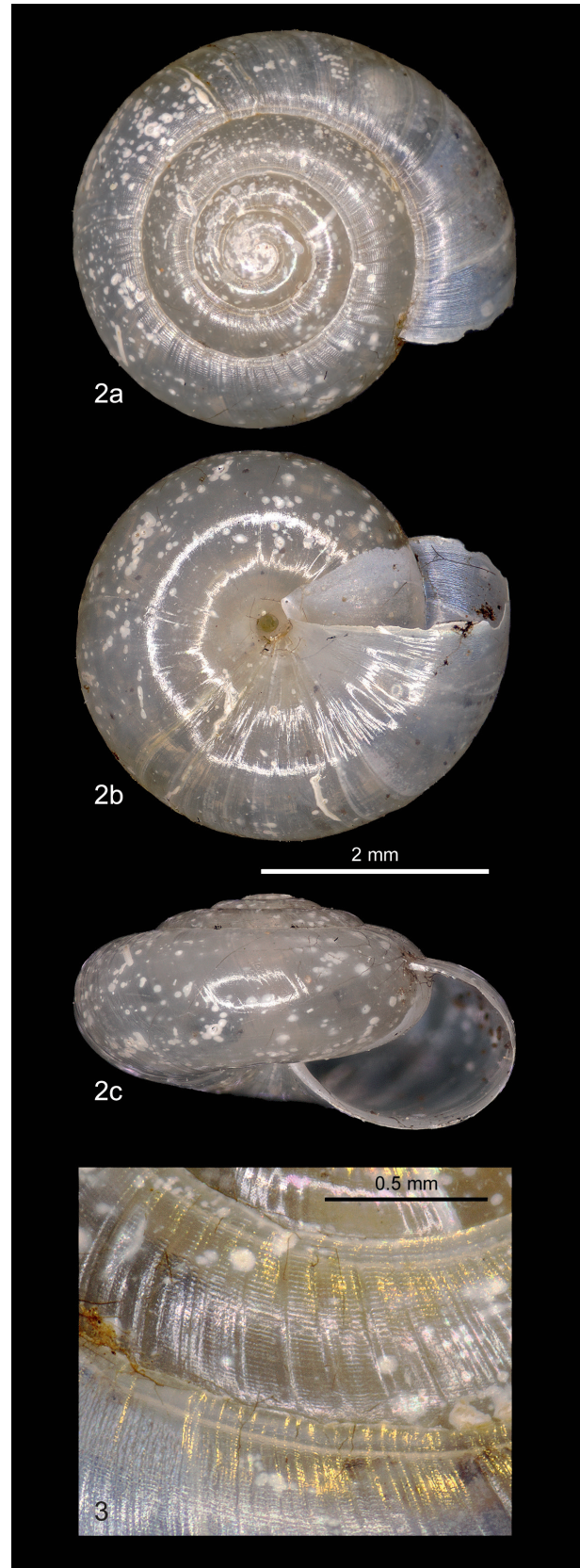


Fig. 1. Second author extracting the specimens of *Mediterranea xylocola* Örstan spec. nov. from the rotting remains of a pine tree at the type locality, 9 July 2006.

Type locality. — All three specimens of the new species were found inside a rotting tree trunk (Fig. 1) in a pine forest among noncalcareous rocks at an altitude of 1350 m (37.1630°N, 28.8973°E) on Sandras Mountain, Province of Denizli, Turkey.

Diagnosis. — Shell ~4 mm in diameter with distinct spiral striae and radial ribs; epiphallus twists around proximal penis and enters penis laterally.

Shell (Figs 2-3). — Shell translucent, thin, fragile. Spire moderate; periphery rounded in frontal view; suture shallow. Aperture wider than high with a thin edge slightly reflected above umbilicus. Protoconch smooth; teleoconch with distinct spiral striae crossed by closely but somewhat irregularly spaced radial ribs; spiral striae especially distinct on penultimate whorl and following first half of body whorl. Ventral side shiny with faint radial and spiral lines especially visible around umbilicus. Umbilicus sunken, narrow, becoming slightly wider and eccentric during last whorl, inner whorls barely visible. At aperture, body whorl ~1.5 times wider than penultimate whorl. Holotype: D: 3.9 mm, H: 2.1 mm, whorls: 4.3; ratio of shell diameter to umbil-



Figs 2-3. *Mediterranea xylocola* Örstan spec. nov. **Figs 2a-c.** Holotype. **Fig. 3.** Close-up of the microsculpture on the penultimate and ultimate whorls of the holotype.

icus: ~10. Paratype (intact): D: 3.9 mm, H: 2.0 mm, whorls: 4.4; paratype (dissected): D: 4.1 mm, whorls: 4.5.

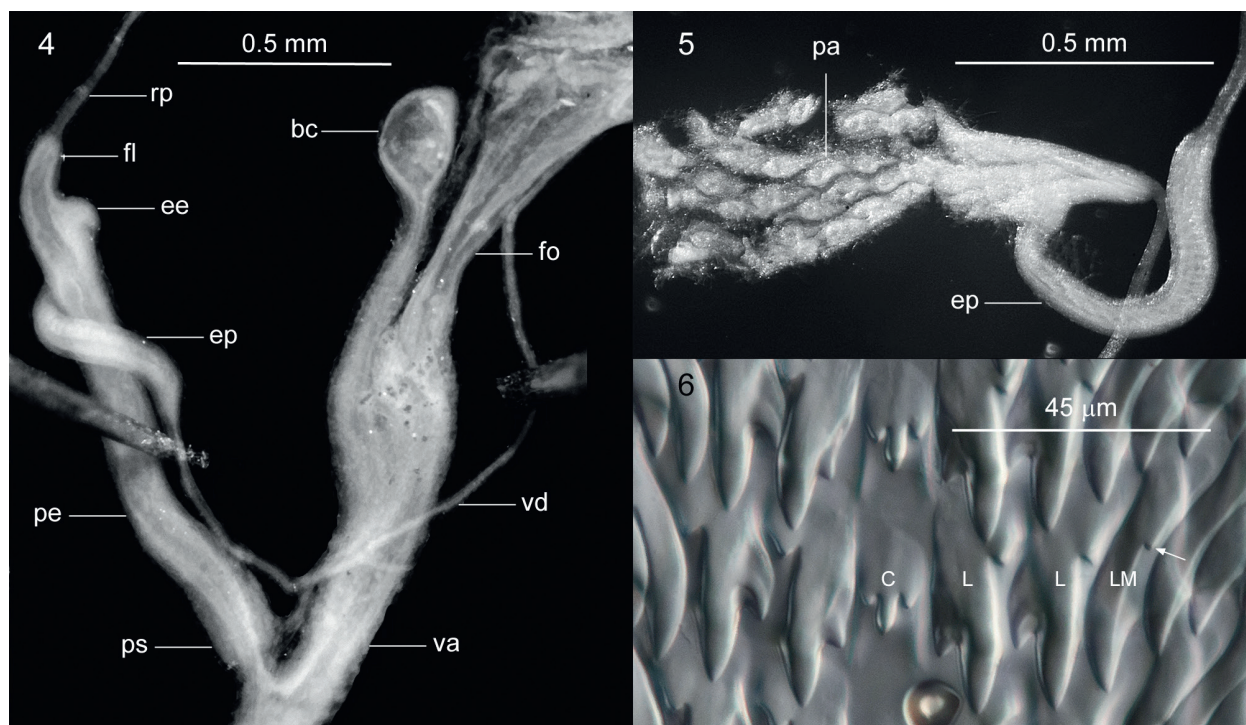
Genitalia (Figs 4-5). — Penis with short flagellum, retractor muscle attaches to flagellum apically; penile sheath covers ~¼ of penis at its distal end; inside walls of penis with diamond-shaped papillae. Epiphallus widens after its junction with vas deferens, maintains uniform width throughout its length, twists around proximal penis and enters penis laterally. Epiphallus not enveloped by or attached to penile sheath; vas deferens loosely attached to penile sheath. Indistinct glandular tissue around proximal vagina and distal free oviduct. Penis about 1.7 times longer than vagina; bursa copulatrix and its stalk about as long as free oviduct, both slightly longer than vagina.

Radula (Fig. 6). — Radula with ~40 rows of teeth; each row with tricuspid central and on each side with two tricuspid laterals, one bicuspid lateromarginal and nine monocuspid marginals. Mesocone of central tooth short, not reaching inside border of basal plate.

Generic placement and comparison with other species. — The new species was initially thought to be in the genus *Lindbergia*, the members of which have equally small shells that also bear spiral lines (Riedel, 1980). Another genus considered was *Vitrea*, which also comprises small snails common in Turkey (Welter-Schultes, 2012). But both gen-

era, in which the penis lacks a flagellum (Riedel, 1980; Schileyko, 2003), were eliminated after the dissection of a paratype showed that its penis had a flagellum (Fig. 4).

The next genus considered was *Oxychilus*, a speciose genus that has long been divided into several subgenera, some of which are characterized by the presence of a penile flagellum (Riedel, 1980; Giusti & Manganelli, 1999). The taxonomy of *Oxychilus*, which will not be discussed here in detail, is currently in an unsettled state and the assignments of the species to subgenera differ among the schemes of different authors (for example, Riedel, 1980; Giusti & Manganelli, 1999; Schileyko, 2003; Welter-Schultes, 2012; Bank & Neubert, 2017). Two former *Oxychilus* subgenera, *Mediterranea* and *Morlina*, that are now considered to be separate genera (Bank & Neubert, 2017), differ from all *Oxychilus* subgenera in having both a penile flagellum and a short mesocone on the central radula tooth (Giusti & Manganelli, 1999). Therefore, the new species was in one of those two genera. In *Mediterranea*, the internal wall of the penis is covered with papillae some which are topped with thorns, while in *Morlina*, the inside of the penis has a longitudinal fold ending with a lobe (Riedel, 1963; Giusti & Manganelli, 1999). Since the internal wall of the penis of the dissected specimen was covered with papillae (Fig. 5), although no thorns were seen on them, the new species



Figs 4-6. Genitalia and radula of *Mediterranea xylocola* Örstan spec. nov. **Fig. 4.** Intact genitalia before the penis was opened. **Fig. 5.** Opened penis. **Fig. 6.** Detail from the radula. Labelled teeth are the tricuspid central (C), two tricuspid laterals (L) and the bicuspid lateromarginal (LM) with the arrow pointing at its ectocone. Abbreviations: bc: bursa copulatrix, ee: entrance to epiphallus, ep: epiphallus, fl: flagellum, fo: free oviduct, pa: papillae, pe: penis, ps: penile sheath, rp: retractor of penis, va: vagina, vd: vas deferens.

has been placed in the genus *Mediterranea*. In *M. hydatina* (Rossmässler, 1838), the thorns are very small and present on only a few papillae (Giusti et al., 1985). If the thorns on the papillae of the smaller penis of *M. xylocola* Örstan spec. nov. were also few in number and even smaller in size, they may have been missed during our examination.

Mediterranea xylocola Örstan spec. nov. differs from the *Mediterranea* species that have been found or likely to be found in southwestern Turkey in the size and microsculpture of its shells. *Mediterranea hydatina*, a species recorded from Turkey, has larger shells (diameter range, 5.0–6.5 mm) without spiral lines (Welter-Schultes, 2012). The morphology of the radular teeth of *M. xylocola* Örstan spec. nov. is identical to that of *M. hydatina* except that the latter species has more marginal teeth (Giusti et al., 1985). *Mediterranea mylonasi* (Riedel, 1983), known from various islands along southeast Greece, also has larger shells (diameter, ~6.5 mm) with very broad body whorls that lack spiral lines (Riedel, 1983: 281). *Mediterranea pygmaea* (Riedel, 1983), known only from the Island of Samos, has slightly smaller shells (diameter range, 3.5–3.9 mm) also without spiral lines (Riedel, 1983: 281).

The twisting of the epiphallus around the proximal penis is a trait that *M. xylocola* Örstan spec. nov. shares with *M. mylonasi* and *M. pygmaea* (Riedel, 1983: 280, 282); however, the same anatomical oddity is also present in *Morlina urban-skii* (Riedel, 1963). As has been noted before (Giusti & Manganeli, 1999), the sharing of characters among these seemingly closely related genera, including *Oxychilus*, is the main cause of the difficulty in the assigning of species to them.

Etymology. — The specific name of the new species was derived from the Latin roots *xylo* (wood) and *cola* (dweller) in reference to the habitat where it was found.

DISCUSSION

The pine trees at the type locality of *M. xylocola* were black pine (*Pinus nigra* subsp. *pallasiana*). We found no shells around the noncalcareous rocks that were also present at the type locality; the only specimens found were those of the new species from a rotting trunk (Fig. 1). It is tempting to hypothesize that *M. xylocola* is specialized to live in rotting wood in high-altitude pine forests in noncalcareous areas. However, such a hypothesis may be premature in the absence of additional records of the new species.

During our trip to Sandras Mountain, we also searched for snails at a second station (altitude, 1480 m; 37.1225°N,

28.8175°E). There, a visual search did not yield any specimens, but a soil sample from the locality later produced one damaged shell of *Punctum pygmaeum* (Draparnaud, 1801). Our findings do support the generalization that land snails are scarce in noncalcareous areas of southwestern Turkey.

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