The limited range of *Albinaria latelamellaris* in southwestern Turkey with the description of a new subspecies (Gastropoda, Pulmonata, Clausiliidae)

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The range of *Albinaria latelamellaris* Neubert, 2000 has been found to cover an area only about 10 hectares around its type locality in southwestern Turkey. A new subspecies, *Albinaria latelamellaris kekovensis* subspec. nov., is described from a disjunct population about 9 km away in the coastal Kekova region. The shells of the new subspecies differ from those of the nominal subspecies in their smaller dimensions and denser ribbing.

Key words: Land snails, taxonomy, distribution, Kekova.

INTRODUCTION

The coastal area of southwestern Turkey around the villages of Üçağız and Kaleköy (Fig. 1) has been known as Kekova (in Turkish) and as Cacamo or Kakava (in the writings of European authors) for more than 200 years (Ainslie & Mayer, 1803; Beaufort, 1817). Kekova has the malacological distinction of being the type locality of five land snail species, including *Albinaria anatolica,* described by Roth (1839). In addition, *Cochlostoma mienisi* was described from Kekova Island just off the coast (Schütt, 1978) and *Albinaria latelamellaris* was described from a location about 9 km northwest of Üçağız by Neubert (in Neubert et al., 2000).

I conducted surveys in Kekova and vicinity in 2014, 2015 and 2018 to determine the ranges of *C. mienisi* (see Örstan, 2015) and *A. latelamellaris*. Here I present the results of my survey for *A. latelamellaris* around its type locality and describe a new subspecies of it from a disjunct population south of Üçağız.

MATERIAL AND METHODS

At each collection station gps coordinates were taken and later plotted in Google Earth and corrected when necessary. Francisco Welter-Schultes's stations from his survey of 1998 (Neubert et al., 2000), which lacked coordinates but gave walking distances from landmarks (Welter-Schultes, personal communication), were also included in the distribution maps whenever their locations could be georeferenced with a reasonable accuracy. The shell height (h) was measured from the apex to the base of the bottom lip and the diameter (d) across the widest (penultimate) whorl with calipers to the nearest 0.1 mm. The rib density (r) was defined as the number of radial ribs per 2 mm on the ventral penultimate whorl. The ribs were counted under a stereomicroscope with a calibrated eyepiece reticle.

RESULTS

Albinaria latelamellaris was described with specimens collected by Francisco Welter-Schultes in 1998 at a single locality (Neubert et al., 2000). In April 2014, the description of the type locality given in Neubert et al. (2000) led me to a small abandoned quarry carved into a limestone hill (36.2543°n, 29.7750°e) east of the village of Sarılar next to the Kaş-Demre road where *A. latelamellaris* was present. Later, I e-mailed a photograph of the station to Francisco Welter-Schultes and he confirmed it as the type locality. I searched for *A. latelamellaris* at and around its type locality in 2014 and 2015 and found it only at three additional stations. These stations cover an area roughly 10 hectares with a maximum linear range of only about 500 m (Fig. 1). The species was sparse; only 15 intact adult shells and a number of fragments were found and just one dormant snail was seen in the field. The distribution area of *A. latelamellaris* is surrounded by agricultural fields, pine forests and the small village of Sarılar, located approximately 500 m to the west of the type locality (Fig. 1). The type locality itself and a small rocky elevation where

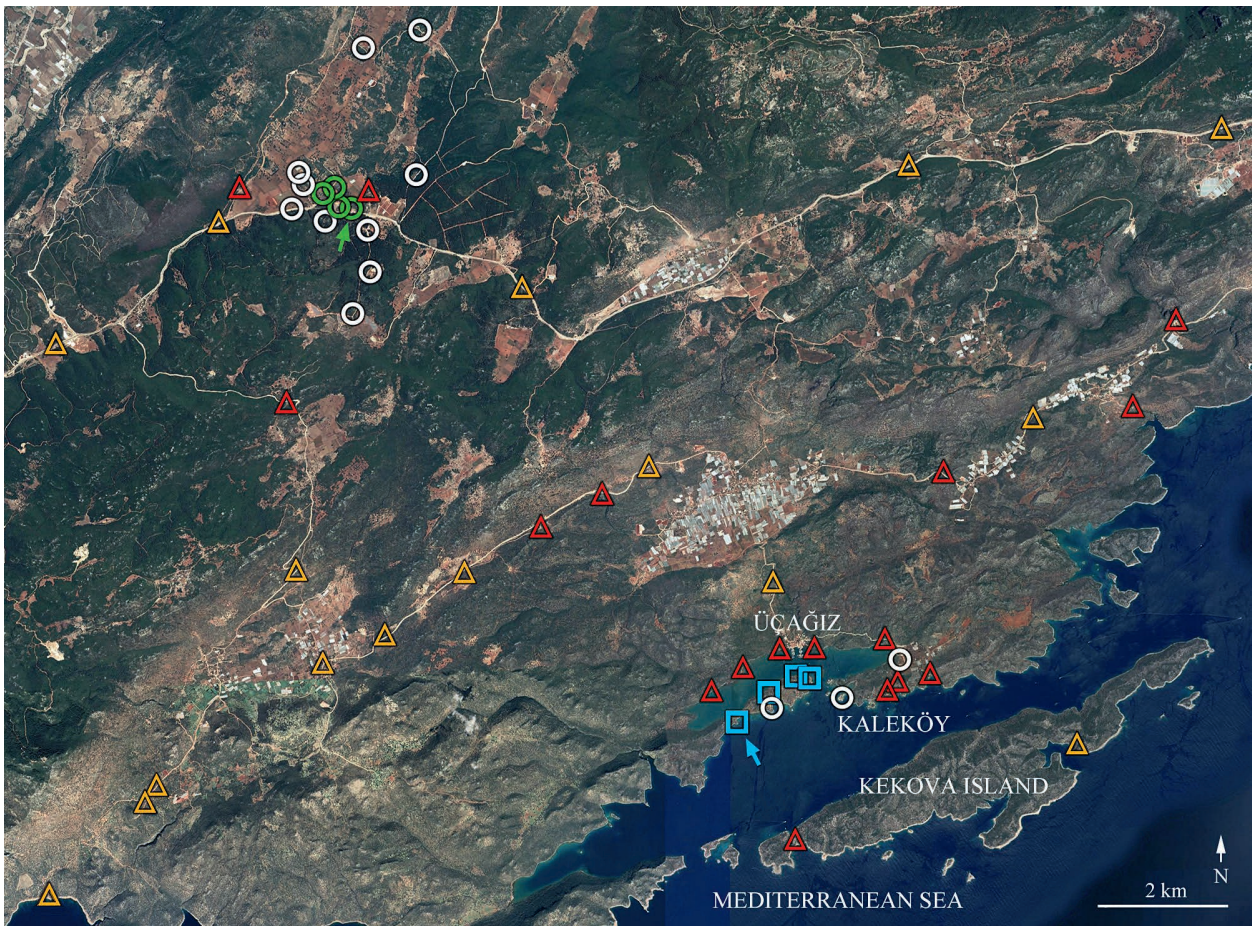


Fig. 1. Records of *A. l. latelamellaris* (green circles), *A. l. kekovensis* subspec. nov. (blue squares), *A. anatolica* (red triangles, this study; yellow triangles, Neubert et al., 2000) and the stations with no *Albinaria* (white circles, combined records from this study and Neubert et al., 2000) in the survey area. The arrows mark the type localities of *A. l. latelamellaris* (green) and *A. l. kekovensis* subspec. nov. (blue). Image from Google Earth Pro; data SIO, NOAA, U.S. Navy, NGA, GEBCO; image © 2019 CNES/Airbus; image © 2019 TerraMetrics.

the species was also found are separated from each other by the paved Kaş-Demre road. Sometime between April 2014 and April 2015, a short and seemingly superfluous unpaved road was opened into the fields through the limestone rocks between the type locality and the village. These roads may be isolating groups of *A. latelamellaris* from each other and potentially contributing to their extirpation.

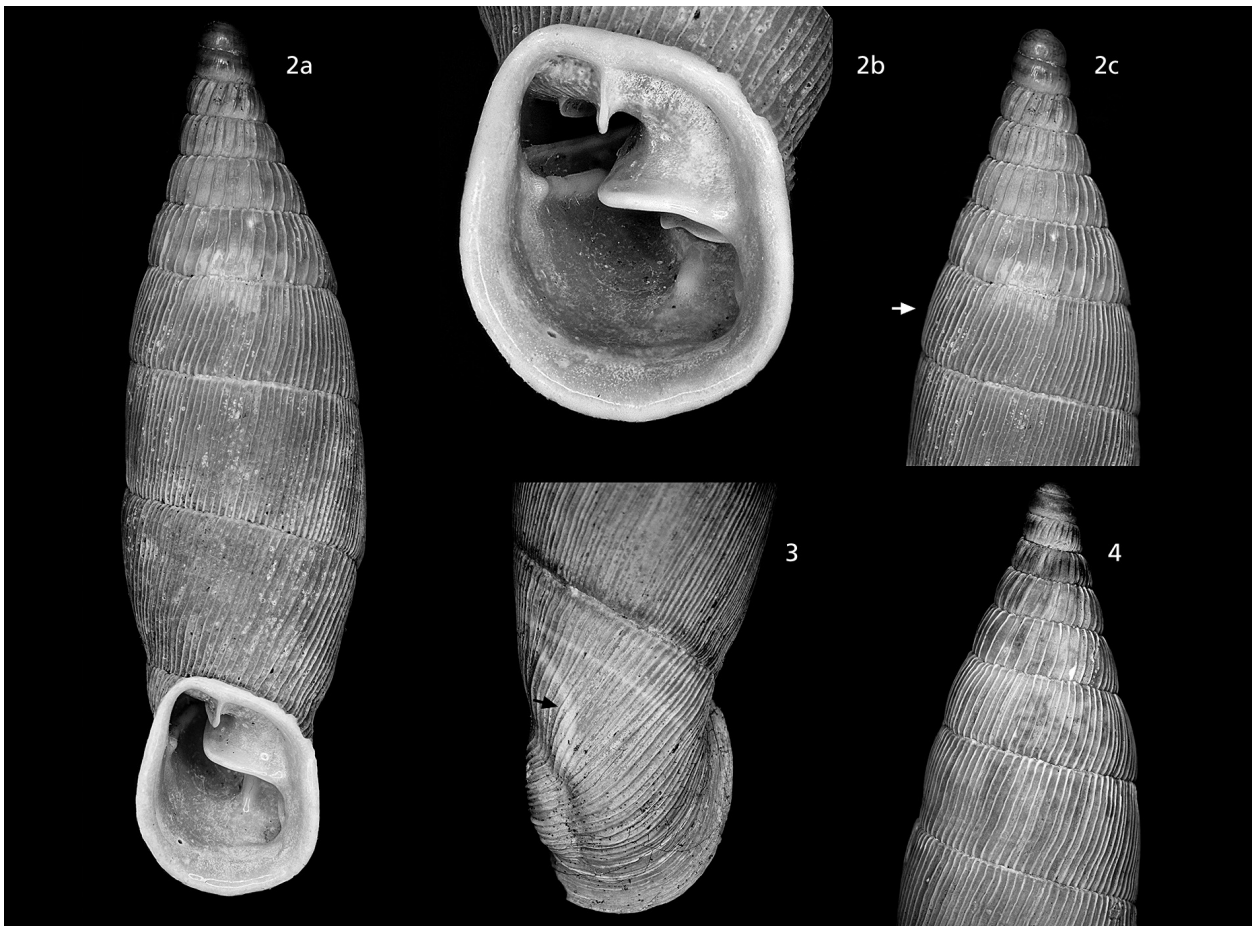
My surveys and the published findings (Neubert et al., 2000) show that *A. anatolica* is commonly distributed around (at one station both species were present) and south of the type locality of *A. latelamellaris* in the area extending to Üçağız (Fig. 1). During my 2015 survey, I collected a number of *Albinaria* specimens from the small peninsula south of Üçağız. I identified these in my personal database initially as *A. anatolica* (based on their gross morphology) and later as *A. latelamellaris* (based on their apertural lamellae). However, subsequent and more careful examination of these specimens and the new ones from 2018 indicated that they displayed certain conchological characters that distinguished them from the shells of *A. latelamellaris* collected at and near its type locality. I consider this as a new subspecies of *A. latelamellaris*.

Albinaria latelamellaris kekovensis **subspec. nov.**

(Figs 2a-c, 3)

Type series. — Twenty-six shells (19 adults, four adult fragments and three juveniles) were examined. The holotype (CM164004) and eight paratypes (CM164005) from the type locality (station Ke49) have been deposited in the Carnegie Museum of Natural History, Pittsburgh, PA, U.S.A. Eight paratypes (from station Ke44) are in Naturalis Biodiversity Center, Leiden, The Netherlands (RMNH.MOL.340753) and the remaining nine paratypes are in my collection.

Type locality. — The holotype was from among limestone rocks on a small promontory on the south shore of the small peninsula (36.1869°N, 29.8376°E) south of the village of Üçağız (prov. Antalya, Turkey) (Fig. 1).



Figs 2-4. *Albinaria latelamellaris kekovensis* subspec. nov. **2a-b.** holotype and its aperture. The clausilium of the holotype had a shallow notch at its edge that was not seen in other specimens. **2c.** increase in ventral rib density on the antepenultimate whorl (arrow) of the holotype. **3.** dorsal body whorl of a paratype showing the basal keel with the lunella (arrow) visible through the shell. **4.** rib densities of the ventral whorls of a specimen of *A. l. latelamellaris* from its type locality. Images not to scale.

Description. — Shell rotund, widest across penultimate whorl. Protoconch smooth with about 2.25 whorls; end of protoconch not marked. Teleoconch with fine ribs widely spaced until antepenultimate whorl where they become denser. Basal keel short, but prominent; dorsal keel absent. Lip of adult aperture reflected and thickened. Lunella dorsal, curved, connected to basalis. Columellaris prominent; subcolumellaris descends into aperture, visible in oblique view; frontal upper palatal fold present. Spiralis either reaches or ends short of inner end of parietalis and is separated from it by a lateral gap of about 3 mm. Number of whorls: 9.25-10.25. Holotype: H: 19.4 mm, D: 5.4 mm, R: 14; additional measurements in Table 1.

Comparison with other species. — The overall shell shape and the apertural lamellae of *A. l. kekovensis* are similar to those of *A. l. latelamellaris*. The new subspecies differs from *A. l. latelamellaris* in its smaller dimensions and the more densely ribbed teleoconch whorls (Table 1, Fig. 5). On the shells of *A. l. kekovensis* the ventral rib density on the antepenultimate whorl is higher than it is on the preceding whorls, while in *A. l. latelamellaris* the increase in the rib density is less noticeable (Figs 3-4). Comparisons of *A. l. latelamellaris* with *A. anatolica* and other *Albinaria* species of southern Turkey were given in Neubert et al. (2000).

Etymology. — The epithet was derived from the name of the area where the distribution of the new subspecies appears to be confined.

Distribution. — The new subspecies has so far been collected only at four stations among limestone rocks close to the shore on the small peninsula south of the village of Üçağız (Fig. 1). Brief descriptions of the localities, designated with my personal codes, and the collection dates are as follows:

Ke43: North side of the peninsula facing Üçağız. 36.1930°N, 29.8472°E. April 2015.

Ke44: North side of the peninsula, ~450 m southwest of Ke43. 36.1909°N, 29.8427°E. April 2015.

Ke49: Type locality. Small promontory on the south shore

	H in mm	D in mm	R = # ribs per 2 mm
A. l. kekovensis	17.5-21.2 (19.5; 15)	4.7-5.7 (5.2; 24)	12-20 (15; 23)
A. l. latelamellaris	21.9-26.0 (24.0; 15)	5.6-7.2 (6.6; 27)	8-12 (10; 25)

Table 1. Comparison of the dimensions and rib densities of adult shells of *A. l. kekovensis* subspec. nov. and *A. l. latelamellaris*. The range for each measurement is followed in parentheses by the mean and the number of specimens. The mean values of R were rounded off to whole numbers.

of the peninsula, ~630 m southwest of Ke44. 36.1869°N, 29.8376°E. September 2018.

Ke50: Easternmost peninsula, ~190 m southeast of Ke43. 36.1927°N, 29.8494°E. September 2018.

Remarks. — The known population of *A. l. kekovensis* is separated from that of *A. l. latelamellaris* by a span of approximately 9 km populated by *A. anatolica*, which was, in fact, common around the type localities of both subspecies (Fig. 1). In addition, the following land snail species were found at or near the type localities of both *A. l. latelamellaris* and *A. l. kekovensis*: *Metafruticicola schuberti* (Roth, 1839), *Orculella ignorata* Hausdorf, 1996, *Rupestrella rhodia* (Roth, 1839) and *Zonites caricus* (Roth, 1839). *Cernuella virgata* (Da Costa, 1778) was also found at the type locality of *A. l. latelamellaris*, while *Mastus rossmaessleri* (L. Pfeiffer, 1847) was present at the type locality of *A. l. kekovensis*.

Thanks to the presence of abundant ancient ruins, Kekova and its vicinity have so far been spared the rampant development that has spoiled most of the coastal areas of western and southern Turkey; nevertheless the landscape has been marred by innumerous roads, quarries and agricultural establishments. Despite 180 years of malacological collections in the area, one may still encounter surprises as this paper demonstrates. I am planning further surveys in southwestern Turkey.

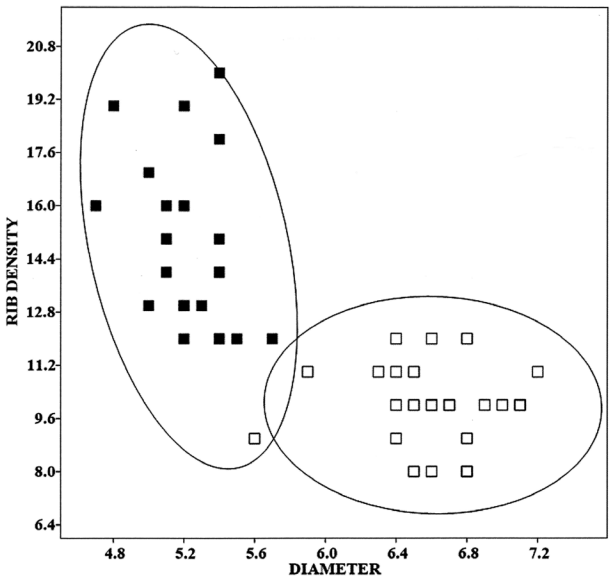


Fig. 5. Scatter plot of rib density (ribs/2mm) against shell diameter (mm) for *A. l. kekovensis* subspec. nov. (solid squares) and *A. l. latelamellaris* (open squares). The ellipses cover the areas where 95% of the populations are expected to fall.

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