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A new species and two new subspecies of *Cristataria* Vest, 1867 (Gastropoda: Stylommatophora: Clausiliidae)

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Abstract. *Cristataria* is the dominant genus of the land-snail family Clausiliidae along the eastern coast of the Mediterranean Sea. Of its roughly 40 known species-level taxa several were only recently described, and further ones may yet to be discovered in some poorly researched regions of the Levant. Here we describe *C. nemeri* sp. nov. from Lebanon's Keserwan-Jbeil Governorate, *C. dutaillyana papillosa* subsp. nov. from Lebanon's North Governorate, and *C. intersita samrae* subsp. nov. from Syria's Latakia Governorate. The habitat requirements and the diagnostic morphological characters of the new taxa are discussed.

Key words. Alopiinae, new taxa, Lebanon, Syria, Turkey

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Introduction

The species-rich land-snail genus *Cristataria* Vest, 1867 represents the Clausiliidae subfamily Alopiinae in the coastal regions east of the Mediterranean Sea. The distribution area of the genus extends from Turkey's Hatay Province in the north to central Israel in the south, with Lebanon as its centre of diversity (Neubert *et al*. 2023). The species of *Cristataria* are obligate limestone-dwellers and require cliff habitats with special microclimatic conditions (Bar 1977; Heller & Dolev 1994). The isolated and often small populations have been subject to relatively fast diversification via non-adaptive radiation driven by a combination allopatry, founder effect, and genetic drift (Gittenberger 1991; Rundell & Price 2009). Similar dispersal and evolutionary mechanisms are responsible for the considerable diversity of the closely related Mediterranean genus *Albinaria* Vest, 1867 (Schilthuizen 2018).

Cristataria is known to include around 30 species, some of which are polytypic with multiple subspecies. Comprehensive overviews of these taxa were provided by Nordsieck (1971) and Neubert *et al*. (2023), whereas those of Lebanon were assessed by Tohmé & Tohmé (1988). Despite these fundamental works, our knowledge of this genus remains somewhat fragmentary because most of the available locality records are old, vague, or erroneous (Neubert *et al*. 2023). There are only few georeferenced data that allow for populations to be precisely located. Furthermore, parts of the distribution range of the genus are still insufficiently researched. To fill in some of the gaps, we introduce three new taxa, which were discovered in materials collected during recent field trips to Lebanon and Syria.

Materials and Methods

The studied material of empty shells was hand collected. Soil contamination of the specimens was removed with a moistened fine brush. Structures of the clausiliar apparatus were examined under a Zeiss binocular microscope. Shells were measured and photographed using a Keyence LHX5000 digital microscope.

The type materials of the new taxa are deposited in the collections of the Hungarian Natural History Museum, Budapest (**HNHM**), Muséum National d'Histoire Naturelle, Paris (**MNHN**), Natural History Museum, London (**NHMUK**), Naturhistorisches Museum, Vienna (**NHMW**), and Naturmuseum Senckenberg, Frankfurt am Main (**SMF**), as well as in the private collections of L. Nádai, Budapest (**LNCB**) and M. Szekeres, Budapest (**SZ**).

Systematics

Family Clausiliidae Gray, 1855

Subfamily Alopiinae Wagner, 1913

Genus *Cristataria* Vest, 1867

Type species. *Clausilia colbeauiana* Pfeiffer, 1861; by original designation.

***Cristataria dutaillyana* (Bourguignat, 1868)**

The description of this species (Bourguignat 1868) erroneously gives Beirut as the origin of the type material (Neubert *et al.* 2023). *Cristataria dutaillyana* occurs sporadically in southwestern Syria and northwestern Lebanon over a relatively large coastal area west of the main ridges of the Ansariya and Lebanon Mountains between Latakia in the north and Ghazir in the south. In the North Governorate of Lebanon, we discovered a new subspecies of *C. dutaillyana*, as well as a new locality near Kfar Chellan (34.4233°N 035.9757°E, 350 m elev., leg. A. Kovács, L. Nádai & D. Szalóki) of its nominotypical subspecies.

***Cristataria dutaillyana papillosa* subsp. nov.**
Figure 1A

ZooBank identifier. urn:lsid:zoobank.org:act:7B9D5908-10B1-4499-8409-96B78A66B45C

Differential diagnosis. The new subspecies differs from *C. dutaillyana dutaillyana* (Fig. 1B) in its thicker apex, finer and denser sculpture, and papillate suture between all the teleoconch whorls, as well as in the attached parietal margin of its peristome.

Type locality. Lebanon, North Governorate, gorge of the Abou Ali River NE of Kousba (34.3136°N 035.8618°E), 280 m elev. (Fig. 2).

Type material. All from the type locality, leg. A. Kovács, L. Nádai & D. Szalóki, 08.V.2023. Holotype: MNHN-IM-2000-39804; paratypes: HNHM 105750/1, MNHN-IM-2000-39805/1, NHMUK 20240262/2, NHMW-MO-113884/2, SMF 376792/2, LNCB/53, SZ/2.

Description. The sinistral, light-brownish shell consists of 8.7–11.0 whorls, which are separated by a shallow, conspicuously papillate suture. The evenly widening whorls are finely and very densely costate (20.5–22 ribs on 2 mm of the penultimate whorl). The neck has a long basal crest that is partly visible even in apertural view of the shell. At the base this crest merges with an equally strong transverse crest. There is no dorsal crest. The parietal margin of the oval, non-reflexed peristome is attached to the adjacent whorl. The very long superior lamella ends dorsally. It overlaps with half of the spiral lamella, which is highest near its inner end at the lateral side. The strongly emerged inferior lamella forms a small, inwardly bent lobe before reaching the peristome. The inner end of this lamella is as deep as that of the spiral lamella. The deep outer end of the subcolumellar lamella is not visible through the aperture. The principal plica starts at the dorsolateral side. The short upper plica and the dorsal–dorsolateral lunella are fused to form a moderately bent crescent. The basal end of this fusion structure is connected to a short lower plica with only an anterior part. The clausilium plate, which gradually widens toward its rounded tip, is fully visible through the aperture.

Measurements. Holotype: shell height (Hs) 17.1 mm, spire width (Ws) 3.7 mm, aperture height (Ha) 3.9 mm, aperture width (Wa) 3.0 mm. Paratypes: Hs 14.1–19.5 mm, Ws 3.4–4.1 mm, Ha 3.5–4.2 mm, Wa 2.8–3.4 mm.

Habitat. The new subspecies was found on shaded limestone cliffs in a deep gorge where it occurred together with *Elia moesta* (Rossmässler, 1839).

Etymology. The subspecific epithet refers to the conspicuously papillate suture of the new subspecies.

Remarks. The shell morphology of *C. dutaillyana* resembles that of *C. strangulata* (L. Pfeiffer, 1841) but differs from that species by its less slender stature, dorsal lunella, and weaker or missing transverse crest. Populations of the nominotypical subspecies of *C. dutaillyana* show considerable variation, especially in the strength of the transverse crest (Nordsieck 1971), but that subspecies clearly differs from the new subspecies in all the above-mentioned diagnostic characters. The only known locality of *C. dutaillyana papillosa* subsp. nov. is within the southeastern part of the distribution area delimited by sporadic occurrence points of the nominotypical subspecies (Fig. 2). Because of this geographical vicinity and the conspicuous morphological differences from all populations of the nominotypical subspecies the new taxon may even prove to be a distinct species closely related to *C. dutaillyana*.

***Cristataria intersita* Németh & Szekeres, 1995**

Cristataria intersita has been known from two localities in the southern coastal part of Turkey's Hatay Province near Meydan (Németh & Szekeres 1995; Páll-Gergely *et al.* 2019). The discovery of a new subspecies extends the distribution area of this species to Syrian territory just across the border with Turkey.

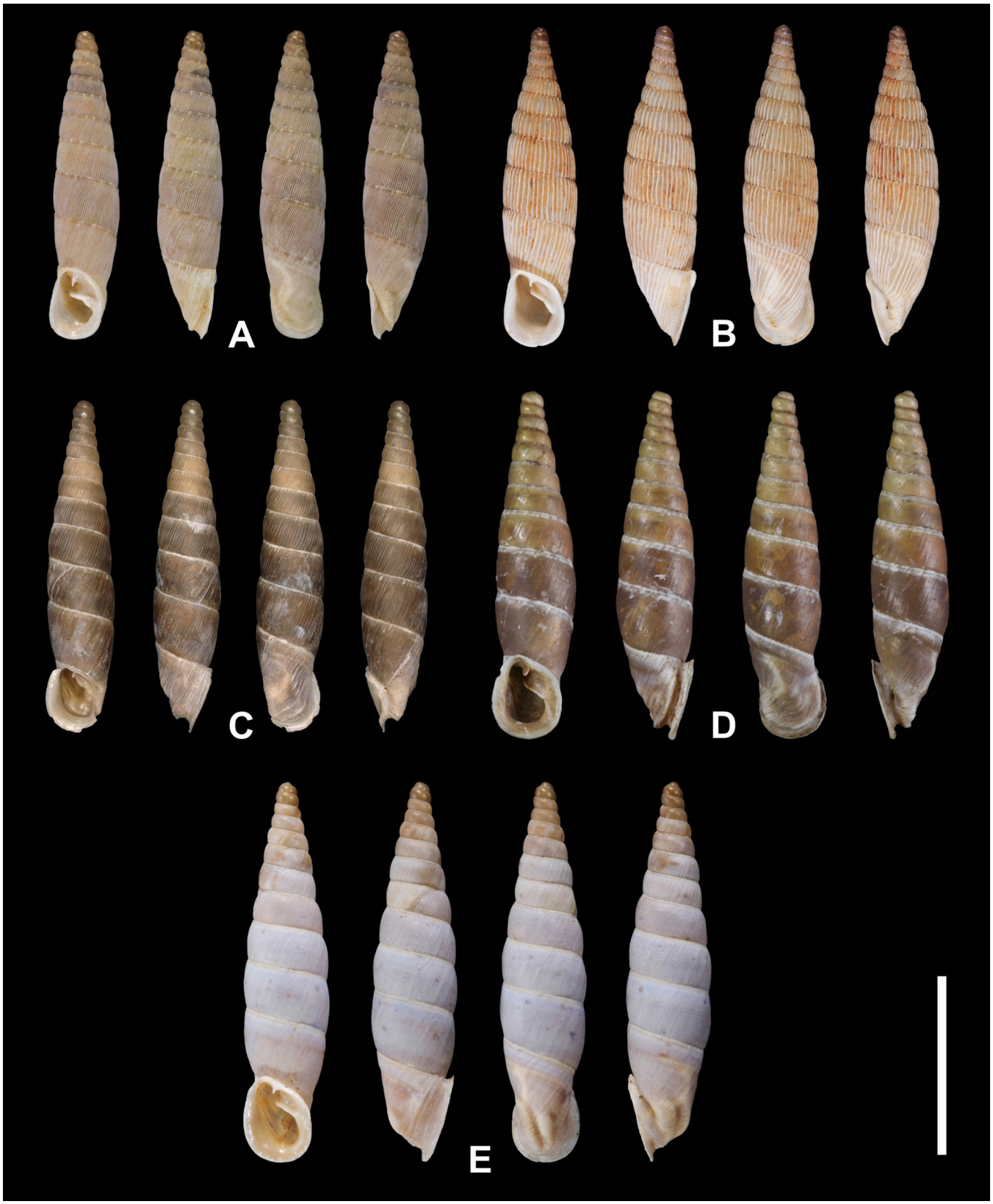

Figure 1. Shells of *Cristataria dutaillyana papillosa* subsp. nov., holotype, MNHN-IM-2000-39804 (**A**); *C. dutaillyana dutaillyana*, Lebanon, Kfar Chellan (**B**); *C. intersita samrae* subsp. nov., holotype, HNHM 104367 (**C**); *C. intersita intersita*, Turkey, Hatay Province, between Tekebaşı and Meydan, holotype, HNHM 105309 (**D**); *C. nemeri* sp. nov., holotype, MNHN-IM-2000-39802 (**E**). Scale bar: 10 mm.

***Cristataria intersita samrae* subsp. nov.**
Figure 1C

ZooBank identifier. urn:lsid:zoobank.org:act:324D3D11-2C68-4D65-9A74-43A10C3F99BE

Differential diagnosis. The new subspecies is distinguishable from *C. intersita intersita* (Fig. 1D) by its more elongate, finely and densely costate shell, stronger neck sculpture, and weaker transverse crest.

Type locality. Syria, Latakia Governorate, cliffs above the beach of Al Samra, WNW of Ziwan Tarak (35.9242°N 035.9111°E), 30 m elev. (Fig. 2).

Type material. All from the type locality, leg. A. Kotán, E. Mizsei, T. Németh & N. Rahmé 3.VI.2010. Holotype: HNHM 104367; paratype: SZ/1.

Description. The sinistral, dark-brown shell consists of 10.3–11.5 whorls, which are separated by a whitish suture. The fine, dense ribs of the teleoconch (15.5–18 on 2 mm of the penultimate whorl) become strong and widely spaced at the neck. The basal crest smoothly merges with the moderately strong transverse crest. An additional, dorsal crest emerges at the transverse crest and extends upward to mid-height of the neck. The peristome is somewhat thickened and non-reflexed; its parietal margin in not attached to the adjacent whorl. The weak, short superior lamella reaches only as deep as the outer end of the spiral lamella. The steeply descending inferior lamella ends at mid-height of the aperture. The sharply bent lower end of the subcolumellar lamella is visible within the aperture only in oblique view. The principal plica starts dorsolaterally and ends in a weak palatal callus at the transverse crest. The upper plica, starting at the same depth, is connected to the dorsal lunella to form a downward broadening crescent. The lower end of this fused structure merges with a diffuse lower plica with very short anterior and long posterior parts. The clausilium plate is almost entirely visible within the aperture.

Measurements. Holotype: Hs 18.5 mm, Ws 3.7 mm, Ha 3.7 mm, Wa 2.8 mm. Paratype: Hs 15.8 mm, Ws 3.6 mm, Ha 3.7 mm, Wa 2.7 mm.

Habitat. The new subspecies lives on costal limestone cliffs shaded by shrubs and pines (Fig. 3A).

Etymology. The name refers to Al Samra Beach, the type locality of the new subspecies.

Remarks. The shell morphology of *C. intersita* is closest to those of *C. colbeauiana* (Pfeiffer, 1861) of Turkey's Hatay Province and *C. leprevieri* (Pallary, 1829) of Syria's Latakia and Idlib Governorates. From the former it differs in its less obese shape, stronger dorsal crest, and less bent lunella, whereas from the latter it differs in the presence of a dorsal crest and strong lower plica.

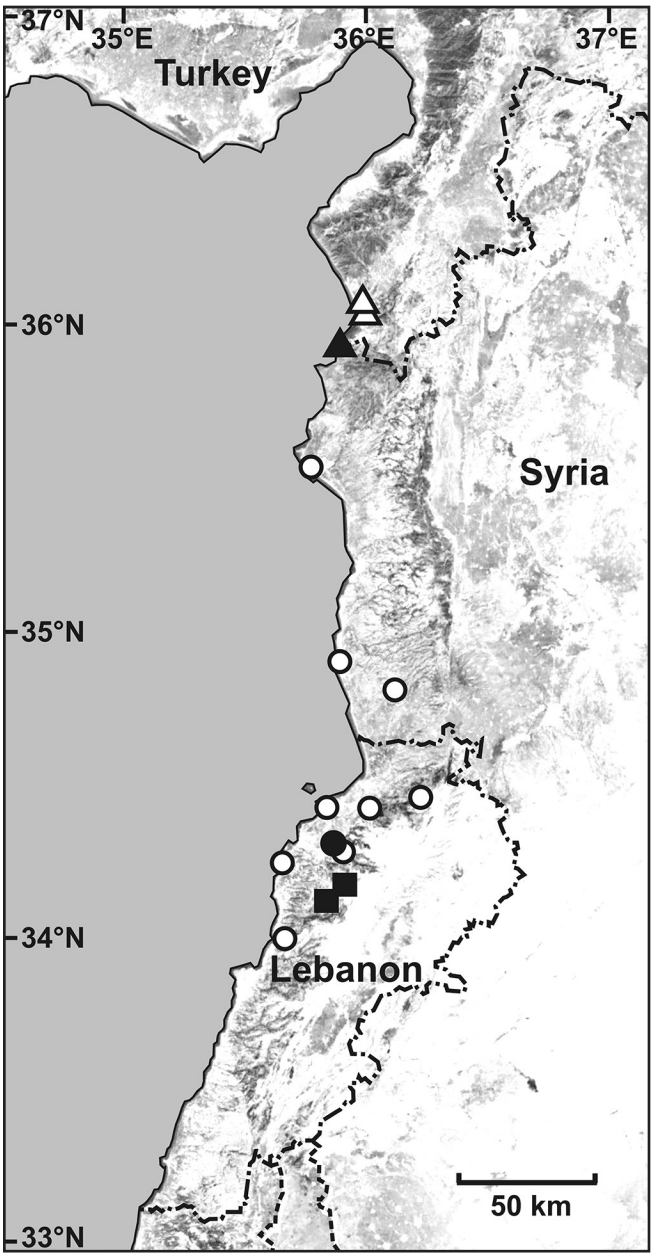

Figure 2. Localities of *Cristataria dutaillyana papillosa* subsp. nov. (●), *C. dutaillyana dutaillyana* (○), *C. intersita samrae* subsp. nov. (▲), *C. intersita intersita* (△), and *C. nemeri* sp. nov. (■).

***Cristataria nemeri* sp. nov.**
Figure 1E

ZooBank identifier. urn:lsid:zoobank.org:act:7AC46C2D-EC61-4367-95F0-F7C0E5A9B3AA

Differential diagnosis. The new species differs from *C. zelebori* (Rossmässler, 1856) and *C. nadimi* Tohmé & Tohmé,

1988 in its non-mottled, whitish surface, from *C. hedenborgi* (L. Pfeiffer, 1850) in its deeper lunella and the presence of a dorsal crest, and from *C. hermonensis* Nordsieck, 1977 in its more obese, non-translucent shell, detached peristome, more emerged inferior lamella, and less deeply positioned lunella.

Type locality. Lebanon, Keserwan-Jbeil Governorate, area of the Ehmej Reforestation Project, SW of Moukhada (34.1314°N 035.8402°E), 1540 m elev. (Fig. 2).

Type material. All from the type locality, leg. A. Kovács, L. Nádai & D. Szalóki 03.V.2023. Holotype: MNHN-IM-2000-39802; paratypes: HNHM 105751/1, MNHN-IM-2000-39803/1, NHMUK 20240261/2, NHMW-MO-113885/2, SMF 376791/2, LNCB/67, SZ/2.

Additional material. Lebanon, North Governorate, Tannourine el Faouqa, leg. O. Theodor 1944, originally determined as *Albinaria tanourinensis* (Germain, 1921) (= *C. hedenborgi*), SZ/2.

Description. The teleoconch of the sinistral, yellowish-brown shell of 10.3–12.4 whorls has a well-developed, uniform whitish surface layer. The smooth surface of the somewhat bulgy whorls becomes finely wrinkled behind the aperture. The strong, almost parallel basal and dorsal crests end before reaching half the height of the neck. There is no transverse crest. The oval, relatively large peristome has a wide margin, the parietal part of which is not attached to the adjacent whorl. The superior lamella is weekly emerged, short, and usually does not reach the outer end of the spiral lamella. The inner, ventrolateral end of the spiral lamella is joined by an insert lamella. The inferior lamella is broadly bent, and its inner end is as deep as that of the spiral lamella. The deep outer end of the subcolumellar lamella is not or only barely visible through the aperture. The principal plica starts laterally and ends on the left lateral side. The short upper palatal plica bends downward to merge with the almost vertical, dorsolaterally positioned lunella. The lower end of the lunella is fused to a lower plica with equally strong anterior and posterior branches, which run along the inner ridge formed by the basal and dorsal crests. The clausilium plate, with parallel margins and a blunt tip, is almost entirely visible through the aperture.

Measurements. Holotype: Hs 21.2 mm, Ws 4.8 mm, Ha 4.8 mm, Wa 3.8 mm. Paratypes: Hs 16.4–22.6 mm, Ws 4.1–4.5 mm, Ha 3.1–5.0 mm, Wa 3.4–4.0 mm.

Habitat. *Cristataria nemeri* sp. nov. was the only clausiliid species found at the type locality, a rocky limestone slope with sparse vegetation (Fig. 3B).

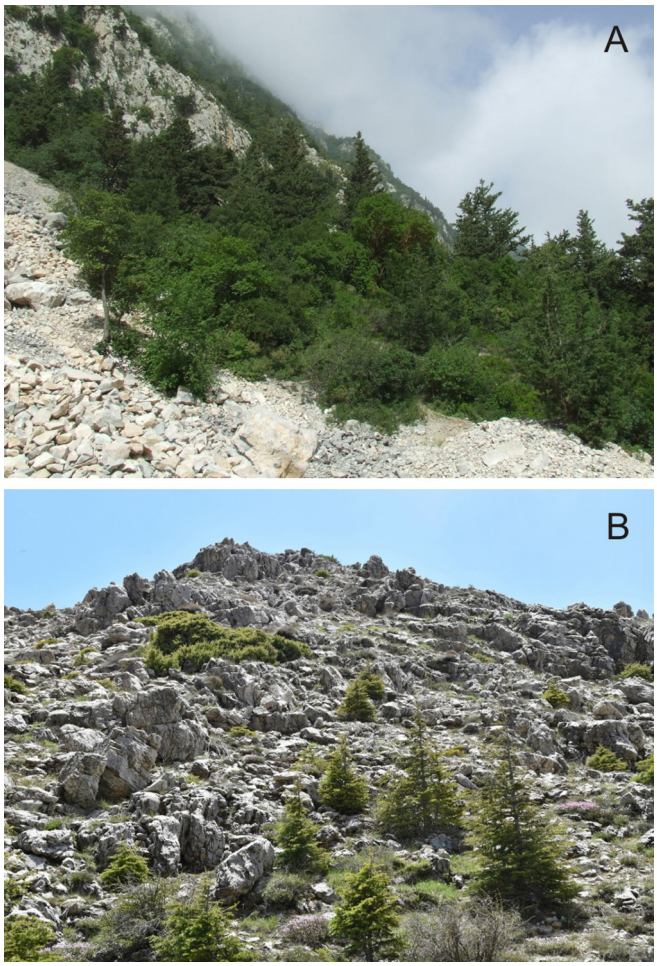

Figure 3. Habitats of *Cristataria intersita samrae* subsp. nov. (**A**) and of *C. nemeri* sp. nov. (**B**).

Etymology. The new species is dedicated to and named after Prof. Nabil Nemer (Holy Spirit University of Kaslik) who provided instrumental support during the field trip that led to the discovery of the new Lebanese taxa.

Remarks. Unlike *C. nemeri* sp. nov., *C. hedenborgi* and *C. nadimi* have only basal crests, whereas *C. zelebori* possesses a strong transverse crest. *Cristataria hermonensis* differs from the new species in its slender, partly translucent shell, converging basal and dorsal crests, attached peristome margin, weaker inferior lamella, and deeper lunella. At Tannourine el Faouqa (34.1820°N 035.9030°E), *C. nemeri* sp. nov. reaches the distribution area of *C. hedenborgi* (see Germain 1921; Neubert *et al.* 2023), which extends to the upper valley of the Abou Ali River near Ehden toward north, whereas its known southernmost point is our new record at the Balaa Cave in the Baatara Gorge (34.17400°N 035.87042°E, 1510 m elev., leg. A. Kovács, L. Nádai & D. Szalóki).

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