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ADDITION TO THE KNOWLEDGE OF THE MEDITERRANEAN MOLLUSCA OF ISRAEL AND SINAI (****)

KEY WORDS: Mollusca, Eastern Mediterranean, recent finding, Indopacific immigrants.

Riassunto

Gli autori pubblicano un aggiornamento dei recenti ritrovamenti, lungo le coste del Mediterraneo orientale, di specie di molluschi che non erano finora state segnalate nei vari lavori pubblicati sulla malacofauna delle acque di Israele e paesi limitrofi.

Nel contempo, viene segnalata la identificazione di altre specie di provenienza Indopacifica rinvenute nella stessa area. Dodici specie vengono elencate per cui il numero di quelle finora identificate nel Mediterraneo orientale sale a 104. Si segnala che, un'altra trentina di specie, anch'esse di probabile immigrazione dalla provincia Indopacifica, sono state trovate lungo le coste di Israele e paesi limitrofi; esse attendono una corretta identificazione per cui c'è da attendersi che il numero delle specie fino ad ora immigrate nel Mediterraneo sia destinato ad aumentare.

Summary

This report deals with the recent findings along the coasts of eastern Mediterranean of several species of mollusca which had not been so far published in the various notes written on the malacological fauna of the Mediterranean waters of Israel and neighbouring countries.

Also, a supplementary list of 12 mollusca recently found in the same area and identified as Indopacific immigrants into the Mediterranean is published bringing their up-to-date number to 104.

Some 30-odd species, also found in the eastern Mediterranean and in all likelihood immigrants from the Indopacific province, still wait definite identification. The number of these species is therefore expected to increase steadily in the course of time.

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The first report, devoted primarily to the mollusca of the Mediterranean waters of Israel, was that of S.C. Hart (1891). In 1934 Aharoni published a list of 60 species collected along the shores of Israel and, shortly afterwards, a comprehensive list compiled by G. Haas (1937) appeared containing 202 species of mollusca collected in the Mediterranean waters of Israel.

Other lists were those of Carmin (1946), Avnimelech and Boskovitz (1955), Lipkin and Safriel (1971), Yaron (1971, 1972), Nordsieck (1972, 1974) and Mienis (1972, 1973, 1976, 1977).

The species included in these publications were mainly collected on the beach or in shallow water accessible to shell collectors.

A marked increase in the knowledge of the Mediterranean mollusca of Israel was gained due to the exploitation of the benthic fauna in the infralitoral of the continental shelf. Many species of mollusca were collected by the Sea Fisheries Research Station (SFRS), Haifa between 1946 and 1950 and the results were summarized in the «Preliminary Report on the Molluscs of the Palestine Coastal shelf» by G. Haas (1951). In this report 123 species were included, collected by dredging from depths of 9-200 meters.

Some years later, Gilat-Gottlieb (1959) reported on molluscs collected from the benthos in Haifa bay. The molluscs also constituted a considerable part of the invertebrates dealt with in Gilat's survey (1964) of the southern section of the Israeli coast.

The sea bed along the Mediterranean continental shelf of Israel and Sinai was intensively explored between 1967 and 1972 by the Joint Hebrew University of Jerusalem-Smithsonian Institution Project (SLM) and, from 1974 to 1977, by the Tel Aviv University (TAU, NS).

The results of the above mentioned activities were consolidated in a comprehensive «Annotated list of the Mediterranean mollusca of Israel and Sinai» containing 702 species (Barash & Danin, 1982).

In recent years, grits taken mainly from the bottom of the Haifa bay were carefully sorted and, as a result, 45 species were identified which had not been previously recorded in the literature of the malacofauna of Israel. A few species were found only in localities situated further south, i.e.: Shiqmona, Carmel beach, Habonim, Hadera, Michmoret and Bardawil.

The following species appeared to be very rare, found as one specimen or only once:

Alvania oranica
Atlanta fusca
Carinaria mediterranea
Alvania zylensis
Ondina dilucida
Retusa minutissima
Limopsis minuta
Modiolula phaseolina
Spondylus gussoni
Lima gwyni
Diplodonta apicalis
Abra nitida

The particulars of the 45 species are given hereunder.

Clanculus of. *striatus* (Mts. 1880) = ? *debilis* Pallary, 1904. Shiqmona, Haifa bay. In *La Conchiglia* **16** (188 189): 24.

Tharsiella depressa (Granata, 1877)
Shiqmona, Haifa bay. In Oliverio (1982: 7, three figures).

Ersilia mediterranea (Monterosato, 1869)
Shiqmona, Haifa bay. See Waren (1980: 285, figs. 10, 11).

Cingula macilenta (Monterosato, 1880)
Haifa bay (–40/–70 mts.). See van Aartsen & Verduin (1982: 128, fig. 1).

Alvania amatii Oliverio, 1986
Haifa bay. Described from the Turkish southern coast, this species is also known from Kefalinia, Kastos as well as Naxos.

Alvania oranica (Pallary, 1900)
Haifa bay, 1 specimen only. See van Aartsen (1982: 6, figure).

Rissoa munda Monterosato, 1884
Haifa bay. See Verduin (1976: 47, pl. 7, figs. 1-4).

Rissoa diversa (Nordsieck, 1972) = *R. pulchella* Philippi, 1836 not Risso, 1826.
Haifa bay. See Verduin (1976: 42, pl. 5, figs. 1-4).

Heliacus architae (O.G. Costa, 1830).
Haifa bay. See Coppini (1974: 59, 61 fig. 4).

Caecum cf. clarkii Carpenter, 1858.
Shiqmona. See van Aartsen & Fehr de Wal (1975: 84 fig. 1).

Sticteulima jeffreysiana (Brusina, 1869).
Haifa bay (–40/–70 mts.). Usually found in somewhat deeper water. See Bouchet & Warén (1986: 322).

Atlanta fusca Souleyet, 1852.
Haifa bay (1977). Only found once.

Carinaria mediterranea Blainville, 1825.
Haifa bay (1977). Only found once.

Lunatia macilenta (Philippi, 1844).
Off Bardawil, - 46 mts. Only found once. See van Aartsen, Menkhorst & Gittenberger (1984:34 spec. 160; 117 fig. 160).

Cypraeolina occulta (Monterosato, 1869).
Haifa bay. Off Bardawil.
Eastern Mediterranean specimens are somewhat smaller than the type. Sturany mentioned (1896: 9) a variety (form) *minor* (= *obtusa* Mtrs. in coll.) from material originating from between Cerigo and Cerigotto (Kithira and Andikithira, Greece).

The present specimens may very well belong to this variety.

Fehria zenetouae van Aartsen, 1988.
Haifa bay. Found regularly but rarely in material from somewhat deeper water. The species is related to *Bela nana* (Scacchi, 1836) not Deshayes, 1835 (Van Aartsen, 1988; 30-31, Fig. 1 proposed to substitute this name with *Bela menkhorsti*), but that species has polygyrate embryonic whorls whereas the one found in Israeli material — as well as from some other localities — has paucispiral embryonic whorls indicating a lecitotrophic development. The same type of topwhorl is also found in the next species.

«*Bela*» *taprurensis* (Pallary, 1904).
Haifa bay.
The species *taprurensis* (Pallary, 1904) is a sibbling species to *Bela ginnania* auct., non Risso, 1826 = *Bela fuscata* (Deshayes, 1835) but it shows only one and a half (top) whorls indicating no veliger larval stage in the development. «*Bela*» *taprurensis* (Pallary, 1904) is the type species of the new genus *Fehria* described by van Aartsen (1988): 30-31.

Mangiliella caerulans (Philippi, 1844).
Haifa bay.

Mangiliella taeniata (Deshayes, 1835).
Haifa bay.

Mangelia stosiciana (Brusina,1869).
Haifa bay. The specific name should not be spelled *stossiciana* as the species is named after Prof. Stosic.

Mangiliella multilineolata (Deshayes, 1835).
Haifa bay.

Chrysallida obtusa (Brown, 1827).
Haifa bay, Shiqmona and Hadera.

Chrysallida juliae (Folin, 1872).
Shiqmona. Sometimes identified as *indistincta* (Montagu, 1808) which is a different, though related, species.

Chrysallida suturalis (Philippi, 1844).
Shiqmona and Haifa bay.

Odostomia kromi van Aartsen, Menkhorst and Gittenberger, 1984.
Haifa bay. See van Aartsen, Menkhorst and Gittenberger (1984: 52 spec. 249; 124 fig. 249).

Odostomia sicula Philippi, 1851.
Haifa bay and Carmel beach. Many specimens found. Frequently confused with *conoidea* (Brocchi, 1814), a related but different species. See van Aartsen (1987: 11, fig. 13).

Odostomia striolata Forbes & Hanley, 1850.
Haifa bay and Shiqmona. See van Aartsen (1987: 13, fig. 25).

Odostomia verduini van Aartsen, 1987.
Haifa bay. See van Aartsen (1987: 5, fig. 24).

Turbonilla pallaryi Dautzenberg, 1910.
Haifa bay.

Turbonilla pusilla (Philippi, 1844).
Shiqmona and Haifa bay.
Many specimens of this very variable species are now known, including the form *minuscula* Marshall, 1891 which may well be a separate species.

Limopsis minuta (Philippi, 1836).
Haifa bay. Only found once.

Modiolula phaseolina (Philippi, 1844).
Haifa bay. Only found once.

Palliolum incomparabile (Risso, 1826).
Haifa bay. Only found once.

Spondylus gussonii O.G. Costa, 1829.
Haifa bay. Only found once.

Lima (Limatula) gwyni Sykes, 1903.
= *elliptica* Jeffreys, 1863 not Whiteaves, 1861.
= *sulcata* Brown, 1827 not Lamarck, 1819.
Shiqmona. Only found once.

Pteromeris jozinae van Aartsen, 1985.
Shiqmona, Carmel beach and Haifa bay.
Already known from Tripoli coast under Jeffreys manuscript name *Cardita incurva*.
Several valves and specimens. Not to be confused with *corbis* (Philippi, 1836). See van Aartsen (1985a: 290, fig. 1).

Diplodonta apicalis (Philippi, 1836).
Off Bardawil. Only found once.

Goodallia macandrewi (SMITH, 1881).
Haifa bay. Several loose valves and specimens of this very small species are now known. Probably confused with juveniles of *triangularis* (MONTAGU, 1803). See van AARTSEN (1985b: 11 fig. 1, 12 figures).

«*Solecardia*» *recondita* (P. FISCHER, 1872).
Haifa bay. Several loose valves from somewhat deeper water (–70/–140 mts.). See CARROZZA (1983: 69) and also van AARTSEN, MENKHORST & GITTENBERGER (1984: 64).

Hemilepton nitidum (TURTON, 1822).
Haifa bay. See van AARTSEN, MENKHORST & GITTENBERGER (1984: 62 spec. 320, 126, fig. 320).

Parvicardium scriptum (B.D.D., 1892).
Haifa bay and Hadera. Considered as a separate species rather than a variety of *exiguum* (GMELIN, 1791). See van AARTSEN, MENKHORST & GITTENBERGER (1984: 67).

Abra nitida (MÜLLER, 1789).
Haifa bay. Only found once.

Ondina dilucida (MONTEROSATO, 1884).
Haifa bay. See van AARTSEN (1987: 15, fig. 54).

Alvania zylensis GOFAS & WAREN, 1982.
Haifa bay. See GOFAS & WAREN (1982: 7, fig. 19-20 pl. 3 and fig. 22 pl. 4).

Retusa minutissima (MONTEROSATO, 1878).
Haifa bay. Monterosato in *Journal de Conchyologie*, Paris **26:** 159 no. 155.

The appearance of Indopacific species in the Mediterranean was firstly noted in the lists of mollusca collected along the coasts of the southern-eastern Mediterranean: Egypt, Libya, Tunisia (Pallary, 1912 and Steuer, 1939), Cyprus (Monterosato, 1900), Syria and Lebanon (Pallary, 1938 and Gruvel & Moazzo, 1931) and Israel (Haas, 1937 and 1948).

The following publications are also devoted particularly to the migration of mollusca: Barash & Danin (1973, 1977, 1986). Several notes on Indopacific species collected in the Mediterranean have been published by various authors. In the latest list of Indopacific mollusca migrants into the Mediterranean (Barash & Danin, 1986) 92 species are indicated.

When one adds to them the following species collected recently, the total number of so far identified immigrants amounts to 104.

Gibborissoa mirabilis Hornung & Mermod, 1926.
= ? *punctostriata* (Gould, 1861)
Haifa bay, Hadera, Shiqmona, Habonim & Mikhmoret.

At first found in 1970 (two empty shells) on the beach of Habonim, later was collected alive by Mrs. T. Haran at Mikhmoret (1982). The specimens have been compared with the type of H. & M.'s species and found to be identical.

The species can very well be *Gibborissoa punctostriata* (Gould, 1861) but the type specimens (USNM 991), however, is rather worn and, besides, has no trace left of the embryonic whorls. This can already be appreciated from the figure of it as given by Johnson (1964:134, pl. 12, fig. 5).

The description by Gould (1861:400) is perfectly applicable.

Although the identity of *mirabilis* H. & M., 1926 and *punctostriata* (Gould, 1861) seems probable, we cannot give a definitive proof on the basis of the restricted material at hand and therefore use H. & M.'s name as being applicable with certainty. It should be noted that the perfectly preserved shells from Israel show this species to possess several completely smooth embryonic whorls, contrary to what can be deduced from the original description (1926:204, fig. 2).

This, however, is caused by the fact that the original material had its topwhorls damaged.

Most probably, a specimen of this species was described by Nordsieck (1972a: 205 spec. no. 25.101; 1972b: 232, fig. 16) as *Apicularia (Thapsiella) stricta* nov. spec.

Cerithiopsis tenthrenois (Melvill, 1896)
Haifa bay and Shiqmona. First found in material dredged on September 14, 1982 from the bay of Haifa. From then on, regularly found and many specimens known at present.

Although described as a *Bittium*, the 4/4 and 1/2 smooth topwhorls show that it certainly is a *Cerithiopsis*.

Cerithiopsis bacillum (Issel, 1869).
Haifa bay. Several fragments found. No perfect specimen so far found. See Bouchet & Danrigal (1982:21, fig. 77).

Cerithiopsis pulvis (Issel, 1869).

Shiqmona and Haifa bay. After the first finding, as published by van Aartsen & Carrozza (1983:39, fig. 2), this species has been often collected. The topwhorls are now known to consist of 4/4 and 1/2 whorls which are quite smooth, very similar to those of the type species, viz. *Cerithiopsis tubercularis* auct.

Chrysallida pirintella (Melvill, 1910).

Shiqmona and Haifa bay. First found in 1984. Only a few specimens known. Shell white, with 3 teleconch whorls which are almost flat but shouldered thus giving the shell a turreted appearance. These whorls are sculptured by straight, vertical ribs with spirals over the entire height of the whorl, covering ribs and interstices alike. The top whorls are intorted. There is a clear tooth on the columella.

Length: 1,5 mm/2 mm. This small species is very much like a slender miniature of *Chrysallida pygmaea* (Grateloup, 1838).

The identification is based on literature only. It may be the shell figured by Savigny in his plate 3, fig. 40 which Pallary (1926:63) identified with *Pyrgulina nana* Hornung & Mermod, 1924. We think both species so much alike that we should not be surprised to find them identical.

Therefore, the oldest — and best applicable — name is used.

Turbonilla edgarii (Melvill, 1896).

Haifa bay and Shiqmona. First found in 1984. Since then, only fifteen specimens are known from Israel.

Shell withe, with 6 teleconch whorls which are only slightly convex. The whorls carry clear axial ribs as well as spiral sculpture over their entire length. The protoconch is helicoid, with its axis at 90° to the shell axis. There is no tooth but only a slight fold on the columella. Length 2,5/3 mm.

«*Syrnola*» *fasciata* (Jickeli, 1882).

Haifa bay, Carmel beach and Shiqmona. Israeli shells known from 1958 (Carmel beach) onwards. In 1963 it was found at Iskenderun, Turkey.

Identification difficult because of frequent confusion with *Tiberia octaviana* (Di Geronimo, 1973). Although at first sight rather similar, *fasciata* has one very strong tooth as well as some barely detectable fold(s) in the columella. *T. octaviana*, on the other hand, has only some more or less pronounced folds but no teeth, properly speaking. Both species have about the same size (4/5 mm.) as well as brownish spiral colour bands on the flat and otherwise colourless whorls. They also usually show several strong teeth on the inside of the outer lip.

Odostomia lorioli (Hornung & Mermod, 1924).

Haifa bay and Shiqmona. First find in 1974 and not many specimens known up to now. See van Aartsen (1987:11, fig. 14).

Cingulina isseli TRYON, 1886.

Shiqmona and Haifa bay. After the first find in 1980, the species is now frequently found but not in great number.

It has also been found, and many specimens, in material from the Turkish coast near Mersin (leg. H. Menkhorst) but no specimen was obtained alive. See van AARTSEN & CARROZZA (1983:38,39 fig. 1).

Oscilla jocosa MELVILL, 1904.

Haifa bay. From the first find, early in 1984, several other specimens and fragments have been found. Shell white with 5 teleconch whorls which are almost flat. These whorls are sculptured by three very pronounced spiral ribs, the top two of which are slightly more near to each other. Between these ribs there are a great many thickned growth lines clearly visible. The protoconch is tilted, with its axis at 135° to the shell axis. The top whorls thus can not be seen. There is a tooth on the columella which is conspicuous in damaged shells only. Length 2,5 mm.

Oscilla jocosa resembles very much *Cingulina isseli*. However, where *Cingulina* has a smooth columella, the species of the genus *Oscilla* have a clear tooth on the columella. Moreover, the protoconch of *Oscilla jocosa* is more or less intorted while the embryonic whorls of *Cingulina isseli* are helicoid.

Retusa fourieri AUDOUIN, 1826.

Haifa bay, -40/-70 mts. Three specimens only found once.

Many specimens were found at the Turkish southern coast near Mersin by H. Menkhorst so that the species seems to have settled also in that area. See BOUCHET & DANRIGAL (1982: 20 fig. 54).

Cerithium caeruleum G.B. SOWERBY, 1855.

Haifa bay. Several top whorls have been found which evidently did not belong to any Mediterranean species nor to *Cerithium scabridum* PHILIPPI, 1848 or *Rhinoclavus kochi* (PHILIPPI, 1848). These top whorls have therefore been identified to belong to *Cerithium caeruleum* by Dr. Houbrick of the USNM. The species is well known from the Red Sea and PALLARY (1926:68) identified figs. 11.1 and 11.2 of Savingy's plate «coquilles 4» with this species.

Originally figured by G.B. SOWERBY (1855: pl. 179, figs. 61,62).

No fully-grown specimens have been found yet.

Of the 12 Indopacific species above listed, three have also been recorded from Turkey: «*Syrnola*» *fasciata* was found at Iskenderun while *Cingulina isseli* and *Retusa fourieri* at Mersin, as already said.

Finally, it should be noted that the examination of the grits from different localities of the Israeli Mediterranean coast revealed the additional presence of more than 30 species which, most probably, are also of Indopacific origin and the identity of which has not been possible so far to ascertain.

The photographs of 8 species are published on the enclosed Table either because their existing iconography is poor or unreliable.

Explanation of plates

1 *Fehria zenetovae* Van Aartsen, 1988

2 *«Bela» taprurensis* (Pallary, 1904)

3 *Gibborissoa mirabilis* Hornung & Mermod, 1926

4 *Cerithiopsis tenthrenois* (Melvill, 1896)

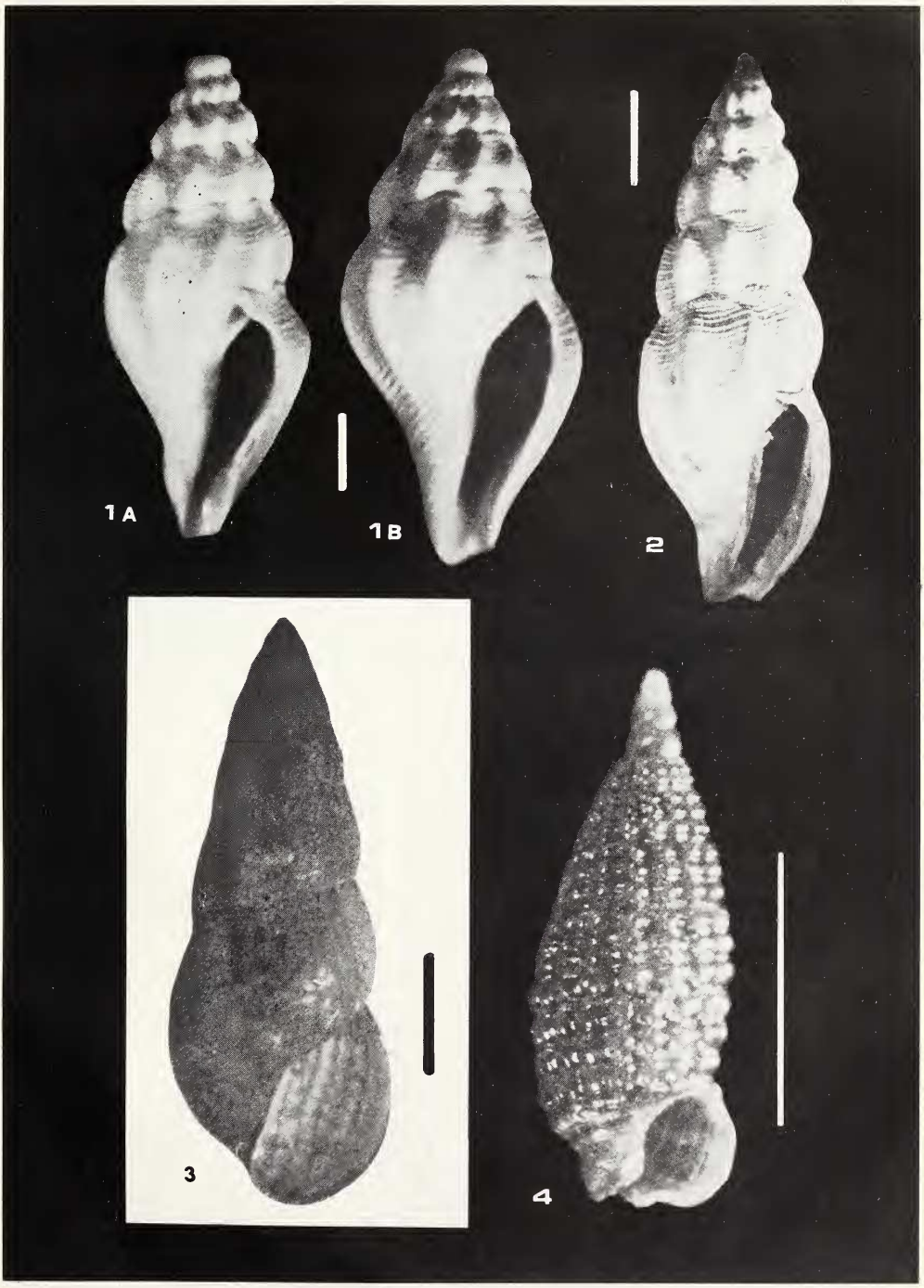
5 *Chrysallida pirintella* (Melvill, 1910)

6 *Turbonilla edgarii* (Melvill, 1896)

7 *«Syrnola» fasciata* (Jickeli, 1882)

8 *Oscilla jocosa* Melvill, 1904

The scale-line denotes 1 mm in each case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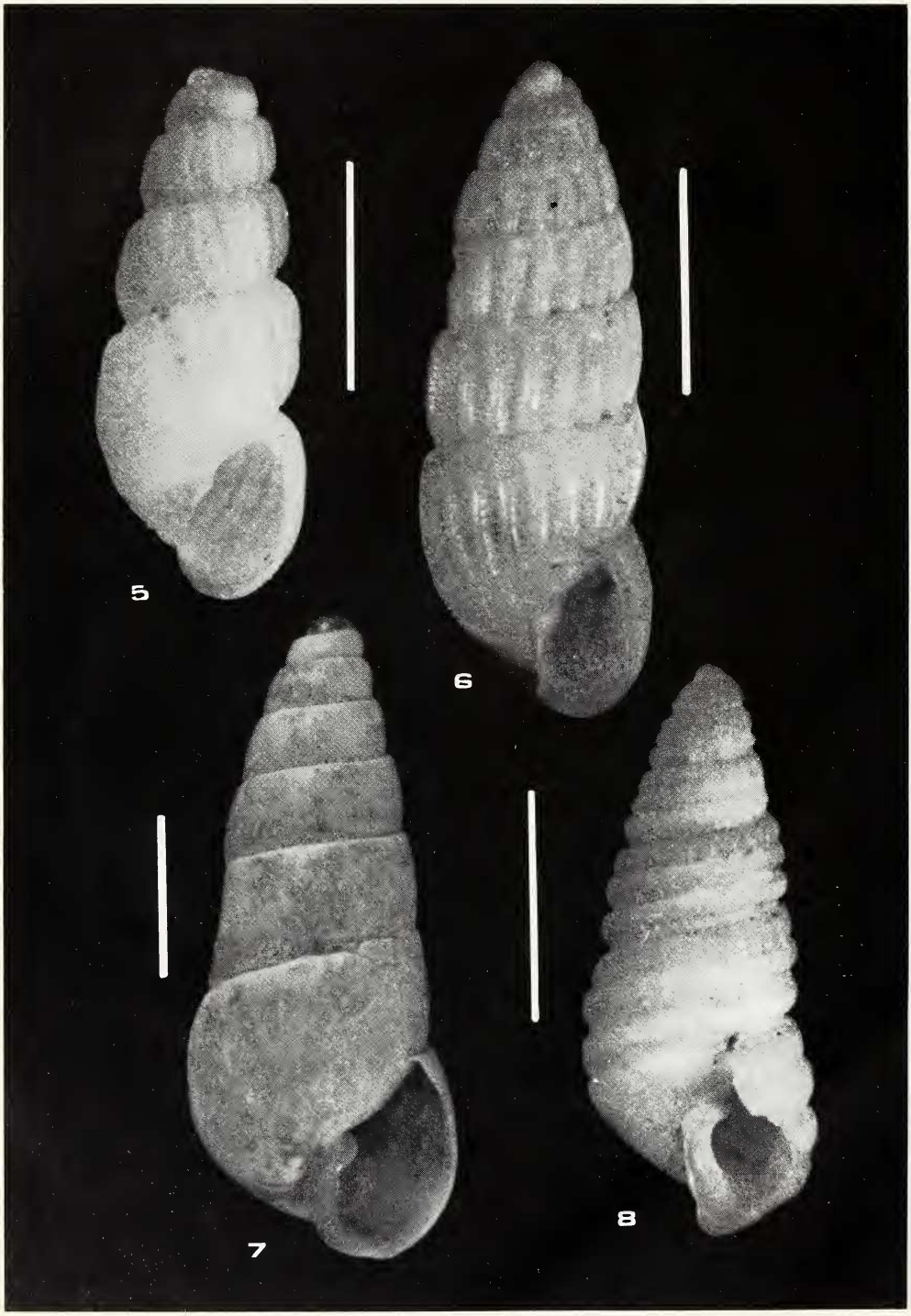
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