

**Notes on the systematics, morphology and biostratigraphy of fossil holoplanktonic Mollusca, 4. A collection of euthecosomatous pteropods from the Miocene of the Karaman Basin, Turkey<sup>1</sup>**

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Euthecosomatous gastropods are recorded from eight localities in the Karaman Basin (Turkey, provinces of Konya and Mersin). Seven of these samples, all from localities close to Karaman, together yielded a total of six pteropod species, allowing an age assignment of (Middle-Late) Serravallian. One sample, from a locality near Mut, c. 70 km SSE of Karaman, is demonstrated to be of Langhian-Early Serravallian age. *Diacrolinia larandaensis* sp. nov. is described.

Key words: Mollusca, Gastropoda, Euthecosomata, Pteropoda, Limacinidae, Cavoliniidae, systematics, Miocene, Langhian, Serravallian, Turkey.

Apart from a few nineteenth century papers, the Miocene molluscan faunas of Turkey have only received attention in Lütfiye Erüal-Erentöz's (1958) PhD. thesis. In that paper, she systematically described not only the rich associations of the Karaman Basin (province of Konya), but also those of the Adana and Hatay basins. The age of these deposits was considered to be 'Vindobonian', which is an ill-defined chronostratigraphical term, including the greater part of the Miocene (Marks & Papp, 1971: 234).

The beautiful molluscan faunas of the Karaman area have been the subject of renewed attention during the last decade. Large collections have been brought together and include numerous species not mentioned by Erüal-Erentöz. Most of this material is housed in private collections, but, partly together with Mr. J. van der Voort (Ostercappeln, Germany), I have collected a substantial material for the National Museum of Natural History, Leiden (= RGM) collections from a number of localities situated S. and SE. of Karaman.

Collecting molluscan material near Karaman is comparatively easy. The Miocene deposits predominantly crop out in a hilly landscape and the molluscs occur scattered on the surface, usually in an excellent state of preservation. Processing of sediment samples is only possible at selected places, as the unweathered sediment usually is indurated and prevents digging. This collection method of course results in an overrepresentation of the larger species. In most cases finer residues can only be obtained from the sediment contents of larger gastropods, provided that these are not too strongly consolidated.

In this material, holoplanktonic molluscs are extremely rare. This is in part due to the fact that the assemblages represent only moderately deep to shallow environments, in which benthic species occur in an overwhelming variety, but which yield only very

<sup>1</sup> For No. 3 in this series see Basteria 63: 1-10, 1999.

few specimens of small and fragile pteropods. This was also demonstrated by Erünal-Erentöz (1958), who did not record a single pteropod or heteropod species from the Karaman Basin. Holoplanktonic molluscs were only recorded in the Adana Basin. In 1990 I collected some material at one locality in the Adana Basin; this will be described in a forthcoming paper.

From several localities in the Karaman area, however, pteropods are now known. These were collected mainly by Mr. van der Voort, but presumably are also present in yet unsorted residues in the RGM collections. Additional samples referred to here were collected by Mr. P. Hessel (Utrecht, The Netherlands) and by myself. The following localities yielded euthecosomatous pteropods:

1. — Karaman (Turkey, Konya), near Lâle (leg. P. Hessel);
2. — Karaman (Turkey, Konya), Lâle Köy (leg. J. van der Voort);
3. — Karaman (Turkey, Konya), Basharman, Tilkikaya, hill slopes on E. side of Gödet valley (leg. J. van der Voort);
4. — Karaman (Turkey, Konya), hill slopes and erosion gullies SW. of Seyithasan (leg. J. van der Voort)
5. — Karaman (Turkey, Konya), hill slopes E. and NE. of Akpınar (leg. J. van der Voort)
6. — Karaman (Turkey, Konya), Pınarlar Yaylesi plateau, 5 km S. of Akpınar (leg. J. van der Voort and A.W. Janssen);
7. — Karaman (Turkey, Mersin), clay outcropping along the road from Karaman to Mut, 16 km S. of Lâle (leg. J. van der Voort);
8. — Köserlerli, SE. of Mut (Turkey, Mersin), greyish marls outcropping along road 715-07-063 (leg. A.W. Janssen).

In this material the following species were encountered:

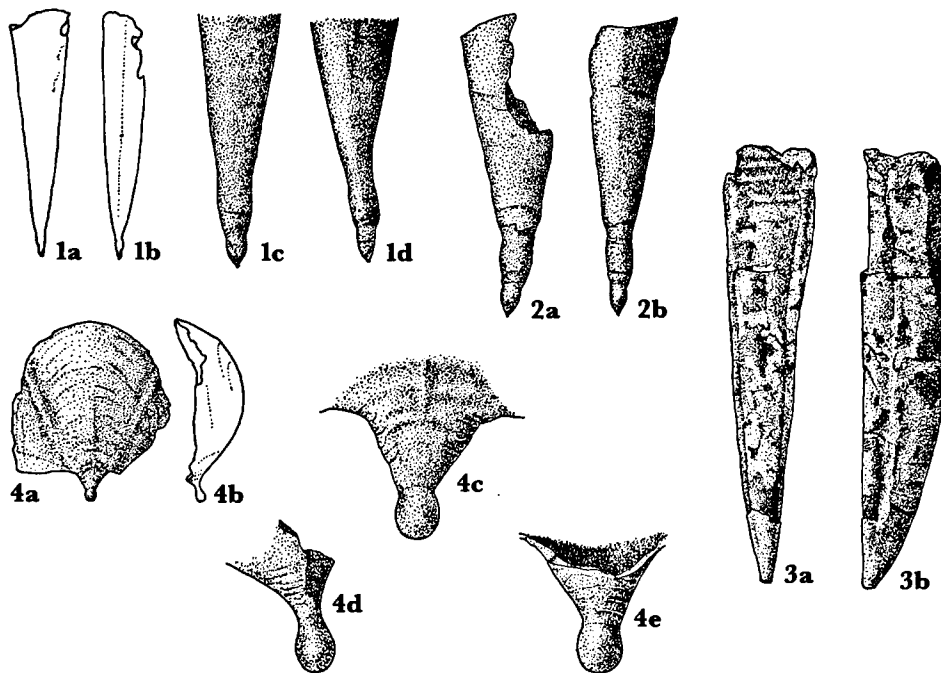
Locality:	1	2	3	4	5	6	7	8
<b>Limaciniidae</b>								
<i>Limacina inflata</i> (d'Orbigny, 1836)	—	—	?1juv.	—	—	1	3juv.	—
<i>Limacina</i> sp. indet.	—	—	—	—	—	—	—	c. 30
<b>Cavoliniidae</b>								
<b>Creseinae</b>								
<i>Styliola subula</i> (Quoy & Gaimard, 1827)	—	—	—	—	—	1juv.	—	—
<b>Clioinae</b>								
<i>Clio</i> sp. indet.	—	—	—	—	—	—	—	1juv.
<b>Cavoliniinae</b>								
<i>Diacroliina larandaensis</i> sp. nov.	—	—	—	1def.	?1fr.	—	—	—
<i>Edithinella varanica</i> (Sirna, 1968)	—	—	—	—	—	—	10	—
<i>Vaginella austriaca</i> Kittl, 1886	—	—	—	—	—	—	—	many
<i>Vaginella lapugyensis</i> Kittl, 1886	7fr.	4	4	—	1	3juv.	4	—
<i>Cavoliniinae</i> sp. indet.	—	—	—	—	2fr.	—	—	—

These samples are housed in the collections of the National Natural History Museum (Palaeontology Department, Cainozoic Mollusca), Leiden, with registration numbers RGM 396.649-668 and 396.673-675.

The most striking feature in this collection is the relative abundance of *Vaginella lapugyensis*, which was found at six localities. *V. lapugyensis*, originally described from the Paratethys Middle Miocene (Badenian) in Romania, is also known from Miocene deposits in the North Sea Basin and the Mediterranean. In its type area, and also in the other areas mentioned, this species usually co-occurs with *V. austriaca*, in deposits of Langhian and Early Serravallian age. In younger strata, still of Serravallian age, *V. austriaca* is absent. This pattern was convincingly demonstrated by Robba (1977: 583, 614) for deposits in the Langhe area (N. Italy) and could recently be substantiated in the Maltese archipelago (unpublished). It follows that localities 1, 2, 3, 5 and 6 (all situated close to Karaman) are undoubtedly of (Middle or Late) Serravallian age. Co-occurring species such as *Limacina inflata*, *Styliola subula* and Cavoliniinae sp. indet. do not contradict such an assignment.

Since *Vaginella lapugyensis* is still a rather poorly known species I include some illustrations of the embryonal shell (figs. 1, 2)

Quite interesting is the occurrence of the cavoliniid *Diacrolinia larandaensis* sp. nov., a defective specimen of which was found in sample 4, with an additional fragment that appears to be conspecific, in sample 5. This new species has also been recorded, as



Figs. 1-4. Miocene pteropods from Turkey. 1-2. *Vaginella lapugyensis* Kittl, 1886; 1: loc. 4, a-b: frontal and lateral view, x 6; c-d: frontal and lateral view of protoconch, x 25; 2: loc. 2, a-b: frontal and lateral view of protoconch, x 25. 3. *Edithinella varanica* (Checchia-Rispolui, 1921), loc. 7, laterally compressed specimen, a: dorsal, b: right lateral view, x 6. 4. *Diacrolinia larandaensis* sp. nov., holotype, loc. 4, a-b: dorsal and left lateral view, x 12; c-e: dorsal, right lateral and ventral view of protoconch, x 25.

*Cavolinia aurita* (non Bellardi), from the higher Serravallian of N. Italy, by Robba (1977: 611), and thus substantiates the above age assignment.

In sample 7 occur a few specimens of *V. lapugyensis*, collected from a slightly decalcified clay, accompanied by a number of poorly preserved specimens of *Edithinella varanica* (Sirna, 1968) (fig. 3), a species known from the Langhian (?) and Serravallian in the Mediterranean area. This sample may thus be considered to be of Serravallian age as well.

Apart from fairly numerous but unrecognisable limacinids and an indeterminate protoconch of *Clio*, sample 8, collected at some 70 km SSE. of Karaman, yielded, many specimens of *Vaginella austriaca* Kittl, 1882. On this evidence, the age of this sample must be Langhian to earliest Serravallian.

*Diacrolinia larandaensis* sp. nov.  
fig. 4a-e

1977 *Cavolinia aurita* (Bellardi, 1873). - Robba, p. 611, pl. 24 fig. 6 (non Bellardi, syn. excl.)

Origin of name. — After Laranda, the Roman name of the city of Karaman.

Type material. — Holotype (defective specimen) RGM 396.666. The specimen illustrated by Robba (1977) from the Serravallian of Ricca-Diano d'Alba (Italy, Alba) is considered a paratype.

A further fragment from locality 5 (see above), also preserving its protoconch, cannot be assigned to this species with certainty, as the greater part of the teleoconch is missing.

Type locality. — Karaman (Turkey, Konya), hill slopes and erosion gullies SW. of Seyithasan, washed from sediment preserved in larger gastropod shells (leg. J. van der Voort).

Stratum typicum. — 'Calcaire gréso-marneux' (Erünl-Erentöz, 1958) (Miocene, Middle-Late Serravallian).

Diagnosis. — A *Diacrolinia* species with a thin central radial riblet in the apical half of the dorsal shell and two strongly diverging ribs running from the apical shell to the transition between the lateral slits and the aperture. Ventral side unknown.

Description. — Adult shell cavoliniform, with a moderately convex dorsal side, ventral side not preserved. The protoconch is globose, slightly flattened dorso-ventrally (width c. 0.24 mm, dorso-ventral diameter c. 0.21 mm), without apical spine, connected to the teleoconch by a narrower tube with an elliptical transverse section. The longitudinal axis of the protoconch deviates c. 30° in dorsal direction from the axis of the teleoconch. Distinct irregular lateral folds ('cracks') are present on the earliest part of the teleoconch, thus demonstrating the post-metamorphosis stage of the specimen.

The posterior margins of the teleoconch are in line. The dorsal shell part is almost as high as wide, moderately convex, with flattened or very slightly concave lateral areas. The ornament includes a very thin but distinct central riblet, which runs from the apical part of the teleoconch to almost mid height. The triangular, regularly convex central shell part is separated from the lateral areas by fairly conspicuous radial ribs that extend from close to the apex to the transition between the lateral and apertural margins, together enclosing an angle of c. 60°. Furthermore strongly curved growth lines are visible, which are relatively more accentuated close to the apex. An internal closing mechanism, as found in *Cavolinia*, is not present or not preserved on the only available, damaged shell.

Discussion. — The genus *Diacrolinia* has recently been erected (Janssen, 1995) to separate cavoliniiform species with a global protoconch from *Cavolinia*, species of which have a dorsally curved protoconch which lack the apical swelling. The type species is *D. aurita* (Bellardi, 1873), which occurs in deposits of Langhian age and differs by its considerably wider radial ribs and less convex dorsal shell part. ?*D. elioi* Janssen, 1995, from the Messinian of N. Italy, has an entirely different ornament on the dorsal side of the shell.

I examined the specimen illustrated by Robba (1977), housed in the Milano collection, in 1992 and included it in my 1995 paper in the synonymy of *D. aurita* with a query because of its poor state of preservation. Now, with the Turkish specimen at hand, it is considered conspecific with *D. larandaensis*, as it shows clearly both the central riblet as well as the relatively narrower lateral ribs.

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