

TAXONOMY AND PALEOENVIRONMENT OF PSEUDORHIPIDIONINA TUBAENSIS N. SP. (FORAM.) FROM THE CENOMANIAN OF TUBA REGION (W BASRAH -IRAQ) ⁺

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Abstract:

Pseudorhipidionina tubaensis, new foraminifera from the Late Cenomanian of Mishrif formation (Tuba region, W Basrah) is described and figured. The paleoenvironment of the *Pseudorhipidionina* is concluded as shallow sublittoral marine restricted environment according to the lithological features and faunal association.

المستخلص:

تم وصف نوع جديد (*Pseudorhipidionina tubaensis*) من الفورامنيفيرا الكبيرة منلسينومنيان المتأخر (تكوين المشرف) في الغرب من مدينة البصرة (جنوب العراق) من بئر طوبا - ١. حددت البيئة الترسيبية على أنها بيئة بحرية ضحلة محصورة أستاذنا" ألى النسيج الصخري المتواجد فيه والفورامنيفيرا الكبيرة المصاحبة له .

Introduction:

The Upper Cenomanian part of Mishrif formation in Tuba region is 155 Ft. limestone succession between the drilled depth 7784- 7939 Ft. in Tuba well no.1, southern Iraq (Fig- 1). This bioclastic formation, generally were described from top to base as fine grained limonitic, fresh water limestone containing charophytae, followed by algal limestone with gastropods, underlain in turn by brown detrital partly shelly and foraminiferal limestone with banks of rudist grading down ward into compacted marly limestone [1].

This limestone sequence is conformably overlying the Rumaila formation (Early Cenomanian) and is disconformably underlying the Khasib formation (Turonian), Its lower contact was drawn at the change from the deep water *Oligostegina* – *Globigerina* limestones of Rumaila formation to overlying shallow water neritic limestone containing miliolids, alveolinids, textularid and algae [1].

The foraminiferal limestone (7829 – 7895) Ft. of Mishrif formation called alveolinid unit according to high percentage of Alveolinidae taxa and represents the lagoonal facies and it is mainly composed of light gray micritic limestone with abundant *Praealveolina tenuis* Reichel; *Chrysalidina gradata* D'Orbigny; *Pseudolituonella reicheli* Marie; *Nezzazata simplex* Omara; *Multisprina iranica* Henson; *Pseudorhapydionina dubia* (De Castro); *Pseudorhipidionina casertana* (De Castro) as well as the new species *Pseudorhipidionina tubaensis* which is described below.

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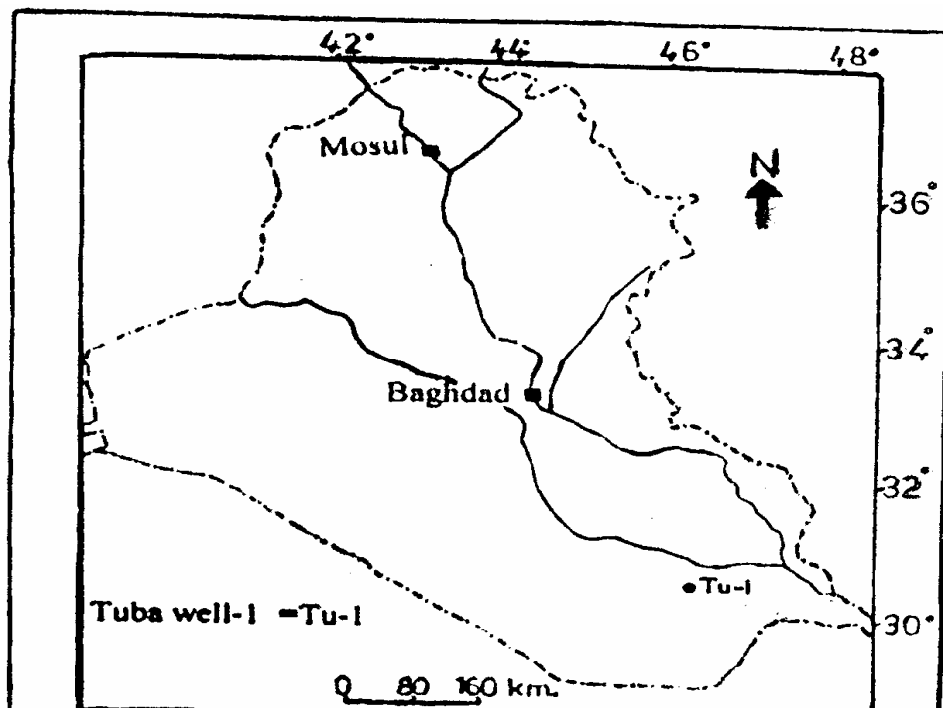


Fig. (1): Location map showing studied well

Faunal Association:

The frequencies of six mainly group of larger foraminifera were determined:

1- Alveolinidae

This family shows a large variation in the transverse outline i.e. (*Multispirina*; *Cisalveolina* ; *Ovalveolina*) and in the degree of elongation i.e. (*Praealveolina*) .The morphological diversity of this group probably indicates that is polytypical.

2- Ataxophragmiidae

The taxon of this group have conical test ,microgranular with hight from 0.7-1.7 mm. i.e.(*Chrysalidina*; *Pseudolitonella*).

3- Peneroplidae

This group shows a distinct variation in size specimens with a relatively large diameter i.e. larger than 12 mm. are present in the lower part of the formation i.e. *Cycledomia* .

4- Nezzazatidae

The Nezzazatidae comprise the following genera; *Nezzazata* with a trochospiral test and *Biconcava* with reversed V form chambers with the test characterized by having large depression in their two sides.

5- Soritidae

Two morphotypes can be distinguished , one with saucer shape planispiral involute small test i.e.(*Pseudorhipidionina*)and the other with planispirally coiled involute test i.e.(*Pseudorhapydionina* ,the hight of test nearly 1.3 mm.

Whole – Rock Thin Sections:

The lithological features ,microscopically investigated are the grain size ,the type of grains and the texture , the proportion of coarse grains which measure more

than 0.5 mm. provided a useful means for the definition of the coarseness of the sediments. Coarse calcarenite grain size are dominated in the lower part of this unit replace by medium fine calcarenite toward the upper part of this unit.

Thin section showed that the average grain size of the coarse fraction exceeds the value of two millimeters especially in the lower part of the alveolinid unit but it is never larger than ten millimeters in the upper parts, the coarse grains are usually well rounded and fusiform, the orientation of the bioclast is variable and the coarse fraction of the sediments consist of the clasts of the larger foraminifera.

Many larger foraminiferal genera were found in the lower part of the unit, these are *Praealveolina*; *Cycledomia*; *Cisalveolina*; *Multispirina*; *Chrysalidina*; *Nezzazata* that the later increase their percentage toward the upper part of the unit, (Fig.-2)

Pseudorhipidionina dominates the assemblages in the medium part of the section its relative frequency varies between 10-15%, the proportion of *Praealveolina* continues to increase in the units of relatively low frequency of *Pseudorhipidionina*. The relative frequency of *Nezzazata* increases to about 40% at the upper part of unit with the associations of Miliolidae, (Fig.-2)

The shallowing trend distinctly prolonged during the deposition of the most of unit as indicated by the continuation of porcelaneous test foraminifera upward trend and coarse grained carbonate accumulated in the shallow sublittoral restricted marine environment.

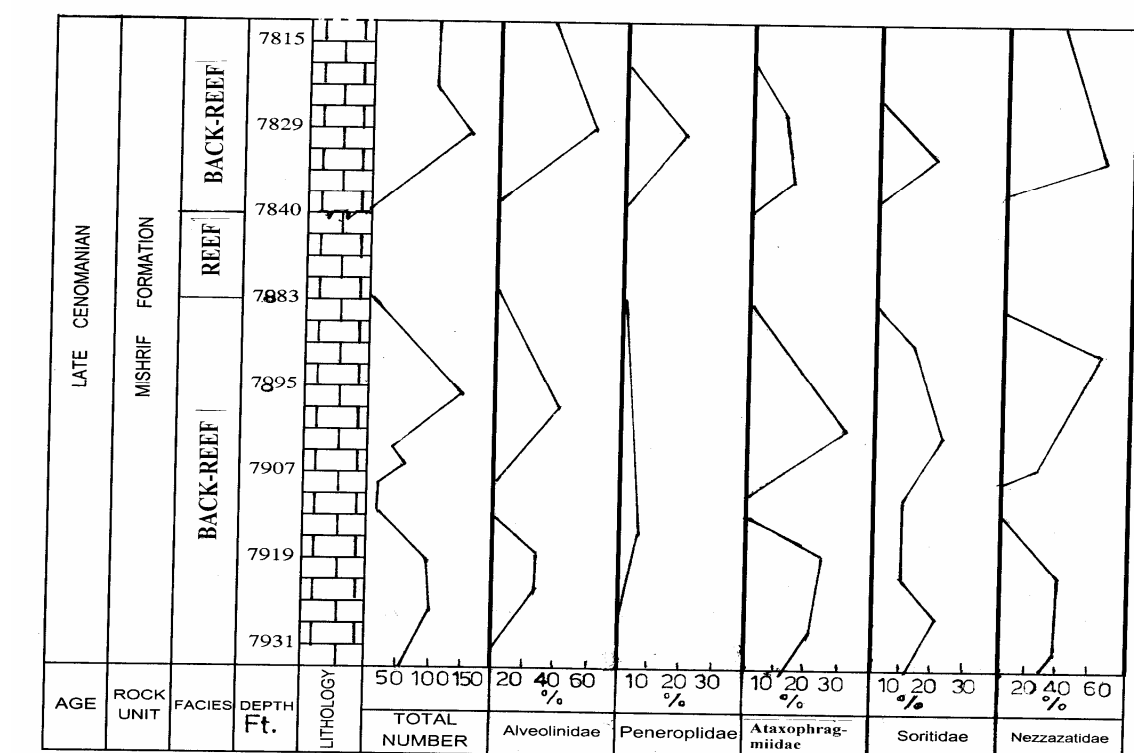


Fig. (2): Total number and relative frequencies of some important larger foraminifera in thin sections of Alveolinid units in Mishrif formation from Tuba well no. 1

Paleoenvironmental Consideration:

As mentioned previously it is uncommon to see the Cenomanian carbonate facies completely because of lateral and upward facies changes as a result of coral – building form deposition type of the Late Cenomanian epoch and reduction the Middle –Late Cenomanian basin if compared with the albian basin.

Pseudorhipidionina tubaensis are common in alveolinid carbonate unit that overlies the reefal unit has been suggested – upward shallowing sequence. Although the depth ranges of our taxonomical groups must have shown considerable overlap. Some differentiation in their stratigraphical ranges are still visible.

Most of the packstone in this unit must have accumulated in shallower marine environment, which is concluded from the presence of large size burrows and numerous clasts of organism living in photic zone, in such an environment it may be expected the bioclasts were laterally displaced, as in the lower part of this unit, the dominated for the *Cycledomia* and *Multispirina* which have discoidal and globular shapes.

The depositional environment of the alveolinid unit which is onlap the reefal facies can be characterized as a part of shallow sublittoral restricted plate form, where open marine conditions prevailed through out.

Family SORITIDAE Ehrenberg 1839
Genus PSEUDORHIPIDIONINA De Castro, 1972
***Pseudorhipidionina tubaensis* n. sp.**
Pl. 1, figs. 1-2, 4-9

1985 *Pseudorhipidionina casertana* (De Castro, 1965), P.95, Pl. 44, fig.10, Pl.

1990 *Pseudorhipidionina casertana* (De Castro, 1965) AL.Nuaimy, P.191, Pl. 29, figs. 7, 11.

Derivation nominis – From the Tuba region (W Basrah city)

HOLOTYPE - Equatorial section, figured on pl. 1, fig. 1 (collection AL Nuaimy, Kirkuk, 1988, 3, 10).

TYPE LOCALITY -- Tuba oil well no.1, southern Iraq, W Basrah city.

TYPE HORIZON -- Neritic facies of Mishrif formation, mostly dense, fractured, detrital, porous very shelly foraminiferal limestone, in association with *Praealveolina tenuis* Reichel; *Cisalveolina fraasi* Cümbel; *Multispirina iranensis* Henson; *Chrysalidina gradata* d'Orbigny, *Cycledomia iranica* Henson; *Pseudolituonella reicheli* Marie; *Pseudorhapydionina dubia* De Castro, *Biconcava bentori* Hamaoui & Saint-Marc; *Nezzazata simplex* Omara; miliolids; gastropods.

External morphology:

Test free, porcelaneous, imperforate, adult of flabelliform shape, planispiral, involute with small umbilical, the profile of chamber is sharp, sutures are depressed, the length of test is 1.80 mm. and axial diameter (0.55-0.65)mm. Equatorial diameter (0.65- 0.75)mm.

The aperture is multiple in cribrate shape situated in the median plane.

Internal structures:

The subspheric proloculus (inner diameter : 0.65 – 0.85 mm.) connected with flexostyle canal which has expanding spiral but not exceed 90°, the height of neck is nearly 0.025- 0.035 mm.

- Coiled stage:

The number of whorls varies (2-3) and their number is reduced with the increasing the dimension of proloculus. The coiling is planispiral but slightly oblique as seen in subaxial section. The thickness of wall is about 0.006mm. in first whole and being 0.009 mm. in third whorls.

In subaxial section, the chambers show generally crescent shaped, but in equatorial section, they are arced out lines and its outer part subdivided by thin septula, which are arranged perpendicularly to the septa.

The number of chambers are generally 5 – 6 in the primary whorl and 10 – 12 in the third whorl, the thickness of chambers wall in adult form is less than the thickness of septums.

- Uncoiled stage

The uncoiled stage is flabelliform with very arced chambers varies from 14 – 18 and the chambers are considerably longer than its higher and the thickness of septum are greater than the thickness of lateral wall and this stage shows a very developed system of narrowly spaced septula.

The endoskeleton with buttresses form being developed perpendicular to the septa of chamber and lined interiorly by concave edge. The buttresses are alternated irregularly and are more frequent in uncoiled stage may reaches more than 40 buttress in the last chambers.

Remarks ---*Pseudorhipidionina tubaensis* resembles *Praerhapydionina murgiana* (Crescenti, 1964) which has the same distribution (Cenomanian – Turonian) but differs by the aperture which is single in *P. murgiana*.

P. tubaensis differs from *P. casertana* (De Castro, 1965) by its more voluminous initial stage; by the absence of a rectilinear final stage that replaced by flabelliform stage; by more developed system of septula of narrowly spaced; by increasing their test dimension, the number of chambers and buttresses in whorls.

Geographic and stratigraphic distribution:

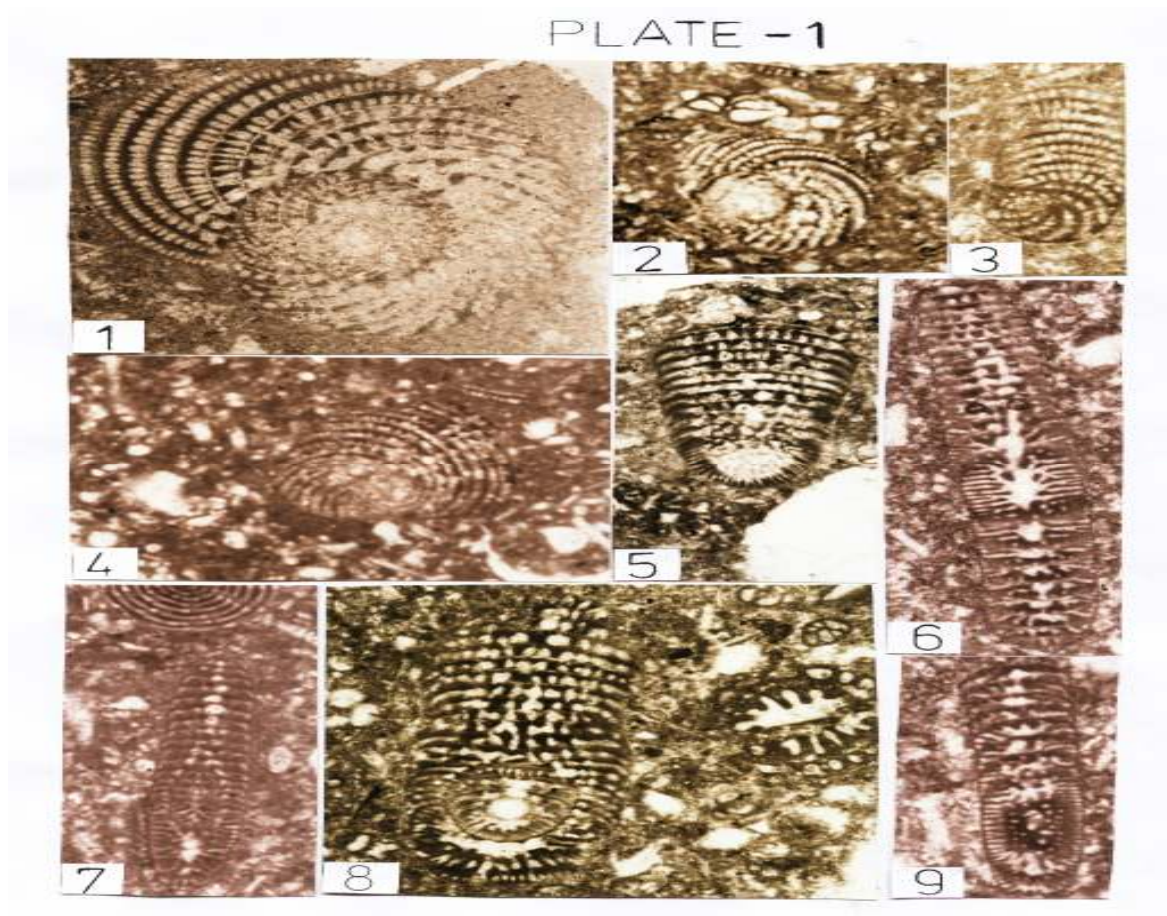
In present study, *P. tubaensis* described from Tuba region (Tuba well no. 1; W Basrah, Iraq) : Upper Cenomanian with *Praealveolina tenuis* Reichel, *Cisalveolina fraasi* Gümbel, *Crysalidina gradata* d'Orbigny, *Pseudorhipidionina casertana* (De Castro); as well as distinguished from Monte Cerreto near Caserta (Campania Italy) as *P. casertana* (De Castro) : Upper Cenomanian with *Cisalveolina fraasi* Gümbel (De Castro, 1985, p. 95).

PLATE -1

1- 2, 4- 9 - *Pseudorhipidionina tubaensis* n. sp., Mishrif Formation, Late Cenomanian.

1-2 Equatorial section showing the coiled and uncoiled stage with the buttresses. Tuba well-1., 1- Depth 7829 ft. (X50), 2- Depth 7895 ft. (X40).

- 3- *Pseudorhipidionina casertana* (De Castro) , Mishrif Formation ; Late Cenomanian, equatorial section showing a rectilinear final stage with buttresses. Depth 7895 ft.(X40).
- 4- Oblique equatorial section showing coiled stage.Depth 7891 ft. (X40).
- 5- Oblique subequatorial section showing the uncoiled stage with the buttresses and the subdivision of outer part of the chambers by septula. Depth 7891 ft.(X40).
- 6- Tangential section of the the flabelliform stage.Depth 7891 ft. (X40).
- 7- Subaxial section showing the crescent shape of chambers. Depth 7891 ft.(X40).
- 8- Subequatorial section showing the priembryonic coiled stage. Depth 7915 ft.
- 9- Oblique axial section of the flabelliform stage.Depth 7891 ft.(X40).



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