

# Early Cretaceous Index Benthic Foraminifera from Northeast of Torbat-e-Heydarieh Area (Esfiyukh Section)

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## Abstract

The first study of early cretaceous succession in Northeast of Torbat-e-Heydarieh, led to recognition of 30 genera and 25 species of benthic foraminifera such as *Rectodictyorbitolina* sp., *Dictyoconus arabicus*, *Orbitolina discoidea*, *Palorbitolina lenticularis*, *Mesorbitolina parva*, *Orbitolina kurdica*, *Praeorbitolina* sp., *Valvullammina picardi*, *Pseudocyclamina lituus*, *Charentia cuvillieri*, *Lenticulina* sp., *Nezzazata picardi*, *Quinqueloculina robusta*, *Nautiloculina oolitica*, *Subaudia minuta*, *Praechrysalidina infracteracea*, *Rumanoloculina* sp., *Choffahella decipiens*, *Vercorsella arenata*. Regard to Stratigraphy range of above mentioned, the Barremian-Aptian age suggested for this succession.

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## Keywords

Torbat-e-Heydarieh, Cretaceous, Benthic Foraminifera

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## 1. Introduction

Stratigraphic cuts located in Razavi Khorasan, 5 km from NE Torbat Heydarieh, in the Esfiyukh section region have been studied; and the geographical characteristics of this cut with the longitude 59°15' and the latitude of 35°20'; 60 thin sections are studied [1].

## 2. Discussion

Sediments thickness in this cut is about 175 m, and consists of Alternatives lime including medium thick layer to

very thick layer. This section with a few meters of conglomerates is held on the Jurassic or older sediments and contains red dark red sand stone to brown sand stone with angular conformity; this section is also covered in the same format with the cretaceous sediments or younger ones.

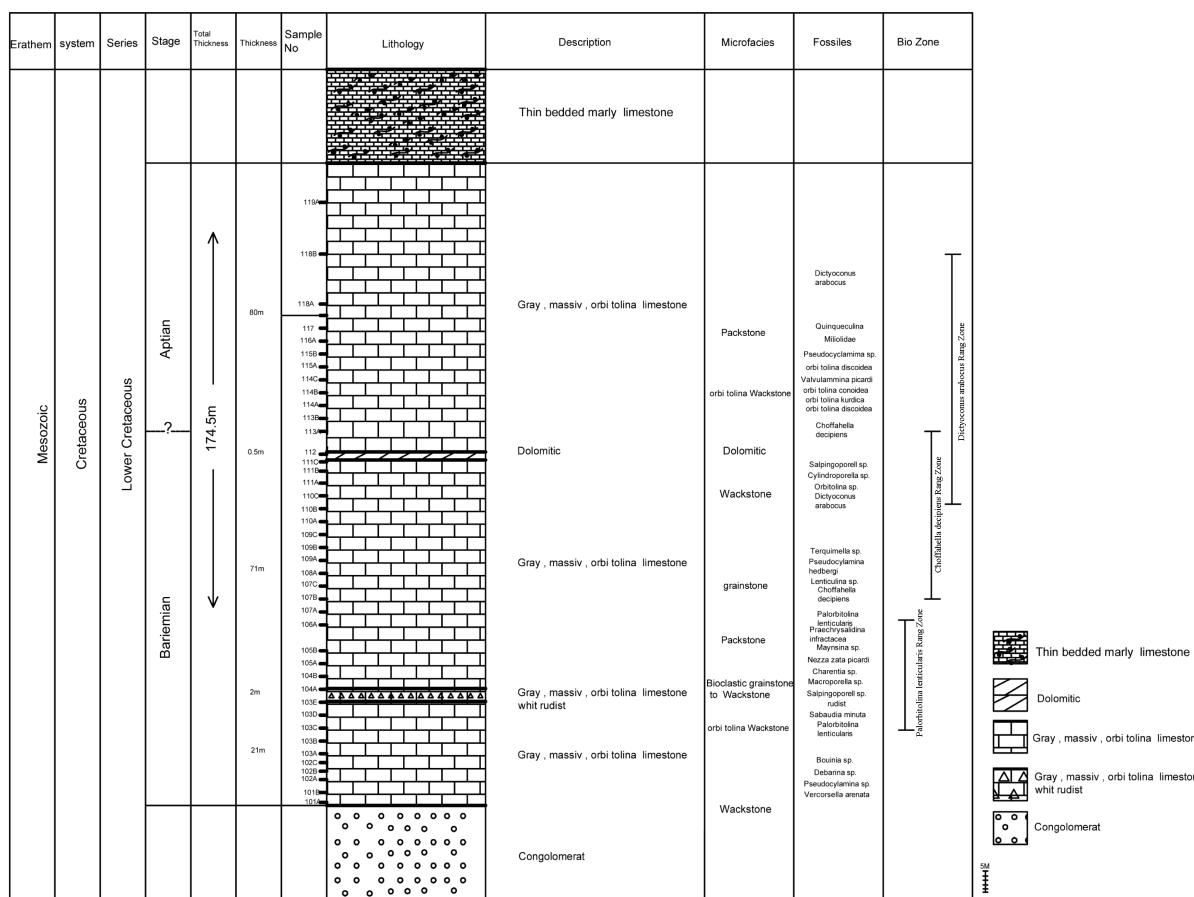
Target sequence from bottom to top are:

- 1) Massive gray limestone containing microfossil orbitolina (5/21 m).
- 2) Brown) gray fossiliferous limestone containing abundant rudist (5/1 meter).
- 3) Massive gray limestone containing microfossil orbitolina (71 meters).
- 4) Dolomite (5/0 mm).
- 5) Thick limestone layer containing a light gray and brown algae and calcareous microfossil orbitolina (80 meters).

Microscopic study of thin sections led to the identification of 30 genera and 25 species of fossil benthic foraminifera as below:

*Choffatella decipiens*, *Vercorsella arenata*, *Cuneolina camposaurii*, *Pseudocyclamina hedbergi*, *Cuneolina pavonia*, *Maynsina* sp., *Debarina hahounerensis*, *Pseudocyclamina litius*, *Charentia cuvillieri*, *Lenticulina* sp., *Nezzazata picardi*, *Quinqueloculina robusta*, *Nautiloculina oolitica*, *Subaudia minuta*, *Praechrysalidina infrateracea*, *Rumanoloculina* sp. *Valvullammina picardi*, *Orbitolina conoidea*, *Rectodictyorbitolina* sp., *Dictyoco-nus arabicus*, *Orbitolina discoidea*, *Palorbitolina lenticularis*, *Mesorbitolina lotzei*, *Orbitolina kurdica*, *Praeorbitolina* sp., *Chrysalidina gradata*, *Everticyclamina hedbergi*, *Mesorbitolina parva*, *Praeorbitolina cormeyi*, *Dictyoconus pachymarginalis* [2]-[6].

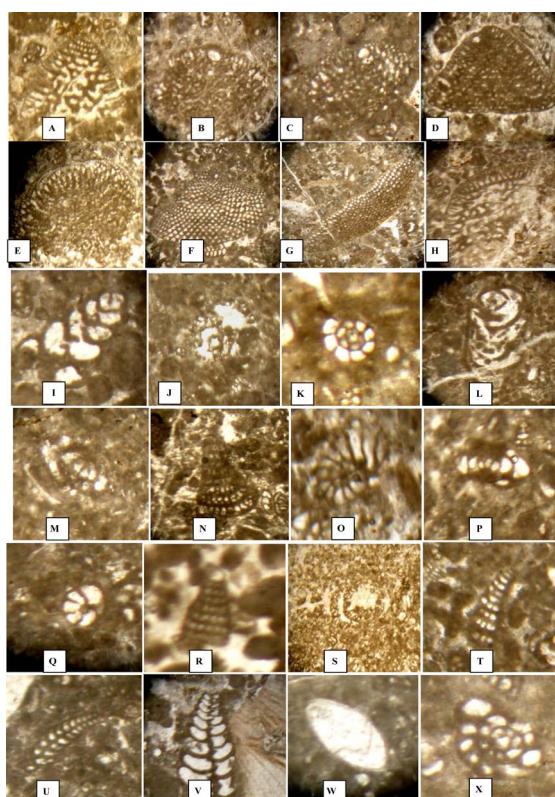
The age of foraminifera Barremian-Aptian is proposed for the sequence which is shown in the **Figure 1** and **Figure 2**. Some of benthic foraminifera section Esfiyukh Mountain are listed and shown in the **Figure 3**. The names of these sections are also referred in the below based on A, B, ... X.



**Figure 1.** Stratigraphic column of time developing benthic foraminifera in Esfiyukh section.



**Figure 2.** Geographical map of Esfiyukh.



**Figure 3.** Some of benthic foraminifera Esfiyukh section [2]-[6]. Plate 1 **A.** *Praeorbitolina* sp. cf. *P. cormeyi* ( $\times 100$ ); **B.** *Mesorbitolina lotzei* ( $\times 100$ ); **C.** *Palorbitolina lenticularis* ( $\times 100$ ); **D.** *Dictyoconus pachymarginalis* ( $\times 100$ ); **E.** *Dictyoconus arabicus* ( $\times 100$ ); **F.** *Mesorbitolina parva* ( $\times 100$ ); **G.** *Dictyoconus ichnusae* ( $\times 100$ ); **H.** *Rectodictyorbitolina* sp. ( $\times 100$ ); **I.** *Everticyclammina hedbergi* ( $\times 120$ ); **J.** *Debarina* sp. ( $\times 120$ ); **L.** *Chrysalidina gradate*; **M.** *Cuneolina camposaurii* ( $\times 120$ ); **N.** *Choffahella decipiens* ( $\times 120$ ); **O.** *Nautiloculina oolitica*; **P.** *Charentia cavigillieri* ( $\times 120$ ); **Q.** *Cuneolina pavonia* ( $\times 120$ ); **R.** *Pseudocyclammina lituus* ( $\times 120$ ); **S.** *Subaudia minuta* ( $\times 120$ ); **T.** *Valvullammina picardi* ( $\times 120$ ); **U.** *Maynsina* sp. ( $\times 120$ ); **V.** *Lenticulinina* sp. ( $\times 120$ ); **W.** *Praechrysalidina infracterace* ( $\times 120$ ); **X.** *Vercorsella arenata* ( $\times 120$ ).

### 3. Conclusion

In this research, for the first time biostratigraphic characteristics of Esfiyukh Mountain located 5 km north of East Torbat Heydarieh have been studied. The sediment thickness is 175 m and involves sections Medium to very thick layer alternatively limestone. This section with a few meters of conglomerates is held on the Jurassic or older sediments and contains red dark to brown sand stone with angular conformity; this section is also covered in the same format with the cretaceous sediments or younger ones. Study of microfossils in this section led to 30 genera and 25 species of fossil of benthic foraminifera as mentioned in passage. The age of the sequence is proposed Barremian-Aptian.

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